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CONTENTS.

ILLUSTRATIONS:	PAGE	GENERAL NEWS:	PAGE
The November Snow Storm on Long Island.....	889	Locomotive Building.....	901
New Passenger Station at Albany.....	890	Car Building.....	901
The Framing of Cars.....	890	Bridge Building.....	901
The Q & W Tie Plate.....	892	Meetings and Announcements.....	901
The New Dry Dock of the Newport News Company.....	893	Personal.....	902
The Crandall Locomotive Bell Ringer.....	898	Elections and Appointments.....	902
CONTRIBUTIONS:		Railroad Construction.....	903
The Design and Loads of the Brooklyn Bridge.....	889	Electric Railroad Construction.....	904
The Trolley Tracks on the New York and Brooklyn Bridge.....	889	General Railroad News.....	905
EDITORIALS:		Electric Railroad News.....	906
The Effect of Truss Rods on Car Body Bolsters.....	896	Traffic.....	906
The Safety of the Brooklyn Bridge.....	897	MISCELLANEOUS:	
EDITORIAL NOTES.....	896, 897	Technical.....	899
New Publications.....	898	The Scrap Heap.....	899
Trade Catalogues.....	898	The Texas Freight Rate Injunction.....	892
		Gage of Railroad Tracks.....	892
		The Powers of the Interstate Commerce Commission.....	893
		Railroad Signals.....	895
		Electric Railroad Building in Havana.....	895
		Foreign Railroad Notes.....	895
		The First Regiment of Volunteer Engineers.....	898

Contributions.

The Design and Loads of the Brooklyn Bridge.

New York, Dec. 12, 1898.

To the Editor of the Railroad Gazette:

The communications to your journal from the engineers, Messrs. Collingwood, Roebbling and Hildenbrand, and the published report of the present Chief Engineer, Mr. Martin, to the Bridge Commission on the question of safety of the New York and Brooklyn Bridge, ought to be reassuring to the public, although buckling of the truss frames may occur again. On the general design of the bridge it would be idle to comment. As Mr. Collingwood truly says, engineers know more about suspension bridges than they did thirty years ago. The unscientific combination of six stiffening trusses (and these of different height), with four cables, the bad features of slip joints, stays and similar makeshifts, are now so well recognized that their occurrence in a modern design would seriously impute the qualifications of the engineer.

The non-existence of a full account and description of the construction, design and computations for the Brooklyn Bridge, similar to that of the St. Louis arch bridge, by Prof. Woodward, has been commented upon many times, particularly also by foreign engineers, and is a greatly felt omission.

Attention is here invited to two facts. One is indicated in Prof. J. B. Johnson's communication of Nov. 25, 1898, to your journal.

The fastening of some of the stays to the masonry at the top of the tower instead of to the movable saddles, and the stiffening trusses anchored into the towers, produce horizontal forces of considerable magnitude, which tend to upset the towers in alternate directions, according to position of live load. They must largely increase the pressure on the outside masonry at the base of the towers. Just how large these horizontal forces can be permitted to be with safety is nowhere recorded, nor does it seem to have ever been considered in any discussion. It is certainly a very important element to take into consideration in the investigation of such an accident as that of July 29, 1898. If a published account of the bridge existed the requisite data for a computation could be taken from it.

The second fact inviting attention is the statement by Col. Roebbling on the overloading of the two middle cables. It is more than probable that the two middle or inside cables do not only carry now a larger proportion of the dead load, but a much larger proportion of the live load than the two outside cables. It may be readily believed that the overloading of the two inside cables is yet very far from having reached a dangerous limit, but it is remarkable that the report of Mr. Martin ignores the important fact mentioned by Col. Roebbling and deals with the factor of safety of all the four cables collectively, rather than showing in detail the strains on the inside and outside cables, as an engineering report properly should do.

There is the further fact that the cross section of the middle pier of each tower is not greater than that of each of the outside piers, and yet the middle pier supports two cables and more than twice the weight of superstructure and live load. It is also subject to twice as large an overturning force at the top.

Mr. Hildenbrand mentions the reconstruction and reinforcement of the Cincinnati suspension bridge, at an expense of \$500,000, as an example of how the Brooklyn Bridge might similarly be reinforced at a probable cost of \$2,500,000. Mr. Hildenbrand does not seem to be aware that \$500,000 would now pay for an entirely new bridge of modern design (suspension

bridge or other kind) over the Ohio River at Cincinnati, and that little more than \$2,500,000 will do the same for a bridge over the East River, not including, however, in either case the uncertain cost of tower foundations, right of way and approaches.

Moreover, Mr. Hildenbrand seems to be wedded to the obsolete and unscientific system of stays and slip joints, which he faithfully retained in the Cincinnati bridge, where he had a good chance to get rid of them. A paper on that work if presented by him to the American Society of Civil Engineers, would be of great value, in view of his large experience as an expert in suspension bridges, and its possible discussion a much desired contribution to professional knowledge.

M. AM. SOC. C. E.

The Trolley Tracks on the New York and Brooklyn Bridge.

To the Editor of the Railroad Gazette:

In the interesting article by Mr. Collingwood on the buckling of the trusses of the New York and Brooklyn Bridge in your issue of Nov. 18 there is one point that is not brought out, namely, that the trolley car tracks on the bridge were not laid according to the plan approved by the Board of experts. It is stated in their report that the tracks must be placed next the outer trusses, or those designated in the above-mentioned article as Nos. 1 and 6, instead of which they were laid on the inner side of the roadway, or next trusses Nos. 2 and 5. Mr. Collingwood states that at some time previous to the accident of July 29 truss No. 3 had buckled, and that this last accident caused greatest buckling in truss No. 4. This shows that the view taken by the board, that the tracks should be placed away from these trusses, was well founded.

As Mr. Collingwood says, the board specified that the cars were not to be run closer than 102 ft.; mention might be made that they further state in their report that if the cars were to be run closer together the outer trusses should be rebuilt.

The reason why the change of position of the tracks was made may be easily seen. If the tracks were laid on the outer edge of the roadway, a surface loop at the New York terminal would be impractical, as at some point the tracks would have to cross the roadway, seriously impeding both the wagon traffic and the progress of the cars. This was avoided in the plans approved by the Board of Experts by making an elevated loop at the New York terminal. It is obvious, however, that the present surface loop, made possible by laying the tracks on the inner side of the roadway, was a vastly cheaper and quicker solution of the problem for the electric railroad companies. By an act of the Legislature they were empowered to cross the bridge in accordance with the plan approved by the Board of Experts, and when the companies proposed the present plan, litigation was brought against them to prevent their adopting it. Just how they were enabled to do so is not clear.

ENGINEER.

[We cannot agree with "Engineer" that the buckling of trusses 3 and 4 indicates that the results might have been different had the trolley tracks been placed on the outside of the roadway. This subject was investigated by the Bridge engineers at the time the Board of Experts recommended that the tracks be placed near the outer cables, and the reasons for changing the location of the tracks was discussed with some care in our issue of Sept. 24, 1897. Referring to the question of the additional loads brought on each of the cables, we stated in effect that the additional weight which would be brought on the inner cables, due to placing the tracks on the inside of the roadway, was no more (and if anything, was less) than would be brought on the inner cables were the tracks placed on the outside of the roadway. To explain this somewhat paradoxical statement, a model was designed to show the amount of strain thrown on each of the cables, due to an additional loading at different points in any one of the latterly braced transverse beams. Should anyone hesitate to accept the apparent teachings of simple trials with a model and be led to question whether the engineers were justified in drawing any conclusions therefrom, an explanation quite apart from those as yet given is worthy of consideration. An examination of the drawings accompanying Mr. Collingwood's article, page 824, shows that trusses 3 and 4 have about twice the depth of the outer trusses, 1 and 6. When the bridge was "outrageously overloaded," on the south side of the bridge or near trusses 5 and 6, these trusses were forced down from their normal positions, the displacement from the normal position being greatest near the middle of the towers. The trusses being continuous for something over 600 ft., either side of the towers (which act much as a fulcrum) the overloading caused the lower chords of the trusses to be compressed more than they could withstand, and consequently something had to give way. The inner trusses having

twice the depth of 1 and 6 would have a tendency to buckle under one-half the deflection that would cause the inner trusses to buckle. It will be remembered, however, that trusses 1 and 6 did buckle, but not as much as did truss 4. It is simply an instance of effect following cause, and it may be questioned if "Engineer's" reasoning is in line with sound engineering doctrine. If the recommendation of the Board of Experts, to place the tracks on the outer roadway, had been carried out, it would have been necessary to elevate the trolley tracks at the New York terminal in order to clear the roadways. This work would have required the expenditure by the electric roads of over \$300,000, and, if completed, would have possessed some features, as the use of a dozen or more elevators, which, to say the least, were too elaborate. It will be remembered that the Board of Experts in this case, as in others, acted simply as an advisory committee, and the engineering department of the Bridge was under no obligation to accept the suggestions of the committee.—Editor Railroad Gazette.]

The November Snow Storm on Long Island.

One of the worst sufferers by the November snow-storm (which was reported in the Railroad Gazette of Dec. 2) was the Long Island Railroad Company. As in numerous cases in the past, the amount of snow falling on the island was greater than in Connecticut and other regions nearby in which the climate is presumably colder, the passage of the northeast wind over Long Island Sound apparently increasing both the volume and the density of the snow. Whatever the cause, the tracks of the rail-

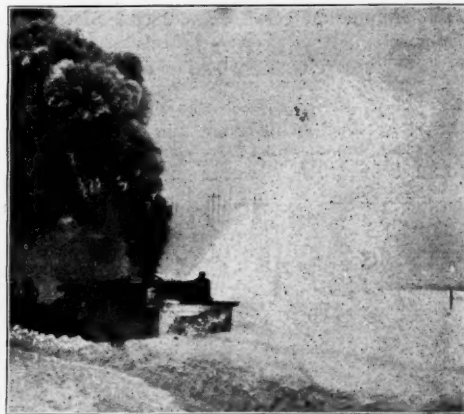


Fig. 1.—Rotary Plow in 5 ft. of Snow—Long Island Railroad, 12 Miles from New York.

road were covered for miles with several feet of snow and in many places with 10 ft. and more.

The Long Island Railroad consists of two lines from Long Island City to the east end of the island, one 95 miles long and the other 116, and a large number of branches of various lengths, all terminating near the western or New York terminus. To adequately deal with deep snow on all of these lines the company ought to have at least 10 snowplows (and for such an unusual fall as that of Nov. 27 it is found that a rotary is also necessary). The various lines near New York are traversed by frequent suburban passenger trains, and to keep them clear plows ought to

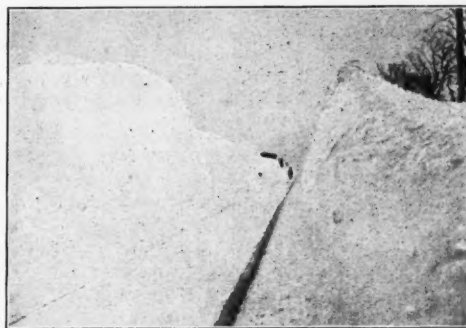


Fig. 2.—Fourteen Feet Deep, November 28, 1898.

This drift was a mile long, and for seven miles farther the snow was from 5 ft. to 14 ft. deep.

be run on 10 lines and branches at the same time. The actual equipment of Nov. 26 was four Russell plows, two of which were at the east end of the island. The storm began in the afternoon of Saturday, Nov. 26, and it was at its height at 1 a. m. of the 27th. The telegraph and telephone wires were all disabled at 9:30 Saturday night, before final orders had been given for the movement of the plows at the east end of the island, and both these were therefore tied up until Monday morning. The men in charge of them could not get orders to run extra, and on Sunday there were no regular schedules on which they could run.

On Monday morning the plow at Amagansett, 107 miles from New York, was run through to Babylon, 68 miles, with little trouble, a part of this portion of the road having been traversed on Sunday by a snowplow sent out from Long Island City. There was considerable difficulty on Monday, however, and

Large bodies of snow were encountered at places which had caused no trouble before (at least not since March, 1888), and a uniform depth of 3 to 4 ft. was encountered for miles together at places too numerous to mention.

Most of the passenger trains caught in the storm

the central platform. The platforms are depressed to the level of the tracks at the south end, and also at a point about 400 ft. north of the lift, to afford a passage for baggage trucks across the tracks at grade.

The general appearance of the station on the side

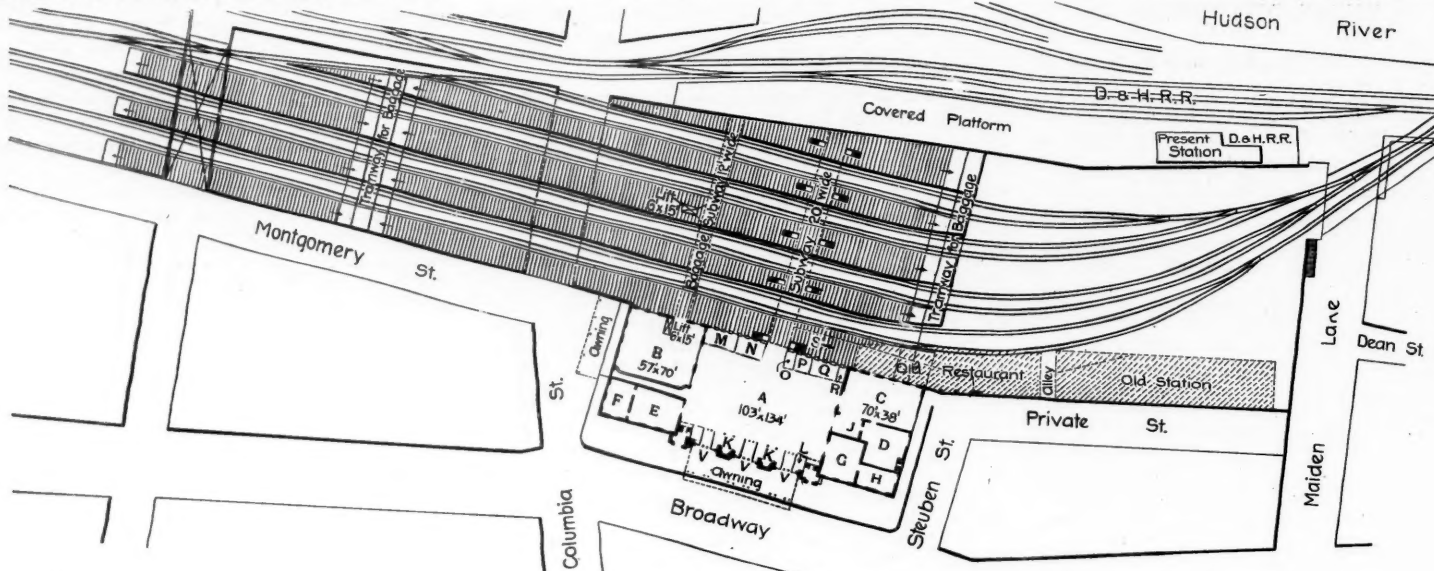


Fig. 1.—Plan of New Union Passenger Station and Relocated Tracks, at Albany, N. Y.

REFERENCES.—A, General Waiting Room; B, Baggage Room; C, Restaurant; D, Kitchen; E, Men's Smoking Room; F, Men's Toilet; G, Women's Room; H, Women's Toilet; J, Café; K, K. Alcoves; L, Elevators; M, Parcel Room and Bureau of Information; N, O, P, Ticket Offices; Q, R, Telegraph and Telephone Offices; S, Out-going Subway; V, Building Entrances.

the Amagansett plow worked the whole of Monday without getting far from Babylon. The plow from Greenport, 95 miles from New York, ran only 20 miles before it was derailed and disabled until Tuesday morning. In spite of all difficulties, all the more important lines were opened Monday and all by Tuesday.

The North Shore Division was cleared in 24 hours; that is, by Monday morning, and the double track line to Babylon, 37 miles from Long Island City, was opened in about the same time, though for a part of

Saturday night and Sunday reached stations, but four late trains on Sunday became stalled in banks, and one freight train was buried on the westbound track west of Hicksville.

The accompanying engravings, made from photographs taken by an officer of the road, exhibit samples of the work done and the difficulties encountered.

New Passenger Station at Albany.

A new Union passenger station is to be built at Albany, N. Y., to accommodate the New York Central & Hudson River, the Boston & Albany, and the Delaware & Hudson railroads. The plans, which have been under consideration for two or three years, have finally been settled upon, and the contract for the construction of the building has been let to Norcross Brothers, of Worcester, Mass.

The new station will be built on the site of the Delavan House, which was destroyed by fire over a year ago. This site is immediately north of the present station. The tracks are to be raised about 3 ft. opposite the station, and about 6 ft. at Spencer street and Livingston avenue, the second and third streets north of the station, so that these streets, depressed about 8 ft., will go beneath the tracks; and the grade of the railroad will be practically level from the drawbridge south of the station to Broadway, several hundred yards north.

The architects of the station are Shepley, Rutan & Coolidge, of Boston. The building will be of Milford (Mass.) pink granite, and the station proper is expected to cost about \$420,000. The general waiting room is 103 ft. x 134 ft., and the restaurant is 38 ft. x 70 ft. The whole building is 288 ft. long, 130 ft. wide, and about 75 ft. high. The general waiting room is about 50 ft. high. This room is finished in mahogany, and the other rooms in quartered oak, but all the principal rooms will have walls of polished granite to the height of 12 ft. The floors are to be mosaic.

The situation of the station, as related to the tracks and the street approaches, is shown in the diagram, Fig. 1. At present the station of the Delaware

toward the street is shown in Fig. 3, and the south elevation is shown in Fig. 4.

The Framing of Cars.*

The purpose of this paper is to enlarge upon some remarks made by the author at the May, 1898, meeting of the Club, when the question of transmitting through the side bearings a part of the load to be carried from the body bolster to the truck bolster



Fig. 4.—Engine Pushing Rotary. The Right-Hand Track has Been Cleared by the Russell Plow. Mineola, 18 miles from New York.

was under discussion. Having taken the position that the present general practice of framing cars could be changed so as to distribute the load to the bolsters, the body bolster in particular, in a way that would be more favorable to the bolsters, it seems incumbent to present such ideas to the Club for the benefit of the members, if the ideas are correct, and for the benefit of the author if the ideas are wrong.

It is necessary, in making calculations of the strength of the parts of a car, to assume a particular loading, and while it is impossible to cover the many different loadings to which cars in general traffic may be subjected, nevertheless if a fair average method of loading is assumed, and provision is made for a liberal factor of safety, it is quite certain that there



Fig. 3.—Four Feet Deep for Four Miles.

On main line, 25 miles from New York.

the way only one of the two main tracks was cleared. Between Mineola and Hicksville, eight miles, both main tracks were buried from 5 to 14 ft. deep the whole distance.

One of these tracks was not opened until Saturday afternoon, a full week after the storm began, although the entire forces of the company had been unremittingly at work the whole of the time. With the push plows alone this snow would not have been cleared even then, but on Tuesday, the 29th, the company bought a rotary plow, which was at once delivered and put at work.

The Wading River Branch, 44 miles long, was cleared by a Russell plow, pushed by three engines, on Tuesday night, but by 3 o'clock the next morn-

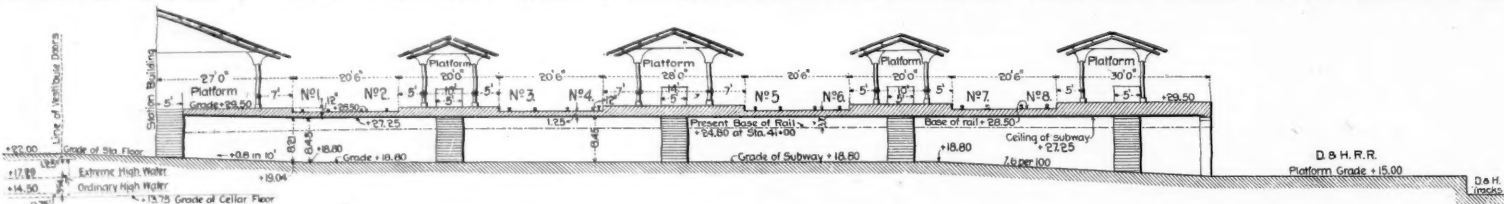


Fig. 2.—New Union Passenger Station at Albany, N. Y.—Cross Section of Platforms and Sheds, Showing Passageway for Passengers Beneath the Tracks.

ing a second snowstorm came on, with a high wind, and this and most of the other lines had to be gone over again; but the whole of the lines of the company were open for regular trains on Wednesday morning, the only impassable portion being the second track between Mineola and Hicksville, before mentioned.

The rotary plow was found invaluable, there being many miles of track, besides the eight miles before mentioned, which, under the circumstances, could not have been otherwise cleared except with shovels. The snow was very wet and difficult to handle, and where it had remained many hours on the track the difficulty of clearing it off was greatly increased.

& Hudson Canal Company's Railroad, about 12 ft. below the level of the New York Central Station, is reached from the latter by way of Maiden Lane, running beneath the Central tracks. In the new arrangement passengers will pass between the Union Station and the Delaware & Hudson platform by the subway shown in Fig. 2.

Fig. 2 shows the arrangement of the train platforms with their coverings, each of which is reached by two stairways from the transverse subway. The subway is 20 ft. wide. This passenger subway will be lined with white glazed brick, and will be brilliantly lighted. The baggage subway, 12 ft. wide, communicates by elevators with the baggage room, and with

will not be experienced so much difficulty as at present from springing bolsters and racked framing.

The Truck Bolster.—Beyond providing a bolster sufficiently stiff vertically to carry the loads imposed, and sufficiently stiff crosswise to resist shocks received lengthwise of the car, little can be done. This bolster is simply a beam supported at both ends and loaded in the middle; the length of the beam may be changed, but as the springs are moved in from the side frames and supported on transoms, as with the swing motion type, then the transoms must

*Extracts from a paper by Mr. F. M. Whyte, Mechanical Engineer of the Chicago & Northwestern, presented November 15, before the Western Railway Club.

be made correspondingly heavier as the bolster becomes shorter and lighter. Considered in a general way, it is easier to provide a substantial truck bolster which will give satisfaction commercially, than to provide a body bolster which shall be satisfactory both commercially and mechanically, because there is more room available for the truck bolster, and the truck bolster is generally shorter than the body bolster. This is the principal reason why more rapid progress has been made in the design and adoption of a satisfactory truck bolster than of a body bolster, and the result has been the very common error of putting a substantial truck bolster under a very weak body bolster; cars so equipped are running with

The duty of the designer is to so locate the sills and rods, and other parts of the framing, that the total moment at the center of the bolster shall be as small as possible. If the declaration that the location of the intermediate sills does not affect the moments at the center of the bolster, on the assumption that the load is uniformly distributed and the sills of equal section, is doubted, it may be quickly proven by assuming a location for the side and center sills, and then for various locations of the intermediate sills, calculating the moments at the center; in such calculations the truss rods need not be considered.

The Truss Rods.—The load on the truss rods is transmitted to them through the needle beams, or

rods, and that the nearer the center of the bolster the truss rods are supported, provided they are loaded the same under various conditions, the better for the bolster. It is also quite certain that the center sills should not be supported on the same needle beams and truss rods, unless, indeed, the truss rods are located inside of the center sills, or the needle beams are sufficiently stiff to carry the load of the side sills without bending upward between the truss rods. This leads to the general statement that, in order to favor the bolster as much as possible through the medium of the truss, the rods should be placed as far inside, that is, toward the middle of the bolsters of the sills on which the rods act as trusses, as the strength

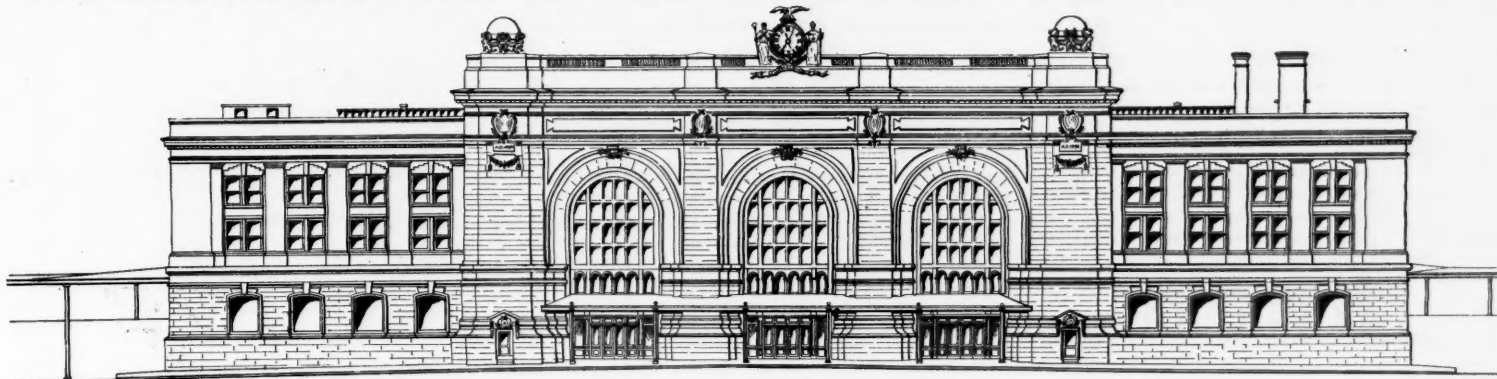


Fig. 3.—Albany Union Station, Broadway Front.

side bearings just as firmly in contact as would be the case were both the body and truck bolsters of the previous weak design.

The Body Bolster.—At the present time the weakest part of the car is the body bolster; in a few designs the strength of the sills and of the draft timbers have been sacrificed in an effort to make room for a stiffer body bolster, and on this account it might be better to qualify the declaration and say that the cars at present are weakest at the body bolster. Obviously, were it possible to deliver the entire load to the body bolster on the surface immediately above the center plate there would be no difficulty in providing a bolster amply strong enough to carry the heaviest car loads now even thought of; therefore, it must be of much advantage to deliver the load to the bolster as near the center plate as possible, and an effort



Fig. 1.

will be made to show how the usual arrangement of sills, truss rods, needle beams, and upper framing can be changed and the result be favorable to the body bolster. Fig. 1 shows a very common distribution of the load on the bolster. The center sills being directly above the center plates, the part of the load carried by them is transmitted to the bolster at the place most favorable to the bolster, and every means possible should be adopted to load them to their full capacity and make them as heavy as it proves expedient; the load carried by the side sills is transmitted to the bolster most disadvantageously, and, therefore, just as little of the load as possible should be carried by the side sills.

Location of Sills.—It will be understood from the above that in so far as the position on the bolster, of the center and side sills is concerned, it is probable that nothing can be done to favor the bolster; this assumes that the width of the car is fixed, and that any improvement which is to be wrought through these sills must be gained through manipulating other parts, to the end of decreasing the percentage of the total load carried by the side sills, and increasing the percentage of the total load carried by the center sills; several ways of accomplishing this will be given in the following: There are several conditions to be considered when determining the location of the intermediate sills, the most important of which is the proper support of the floor between the center and side sills; assuming that the sills rest directly on the bolster and that no truss rods, or needle beams, or other means than the flooring, are used to distribute the load to the sills, the location of the intermediate sills affects in no way the maximum moment produced by the load on the bolster so that, assuming that there is clearance for wheels, rods and pipes beneath the car, these sills should be placed at equal distance from side and center sills in order to give proper support to the flooring. So far as reducing the maximum moment is concerned, the intermediate sills might as well be left out; the use of them neither reduces nor increases the stresses on the center section of the bolsters.

The bolster should be made as deep as possible at the middle, and when the most favorable distribution of the loading to the bolster is found the stresses in the top and bottom members of the bolster may be calculated and the parts proportioned accordingly.

cross center sills, and is transmitted by them to the body bolster. Disregard, for the present, the means by which the truss rods receive their load near the center of their length; given the diameter and number of rods and the angle which they make with the horizontal or vertical, the load which each will transmit to the bolster can be calculated from a quite common formula. Assume that there are two truss rods each side of the center of the car, that they are located at T^1 and T^2 , Fig. 1, a very common arrangement, and that the vertical component of the stress in each is 5,000 pounds; assume, further, that the distance from the center of the bolster to T^1 is 50 in., and to T^2 is 35 in., then the moment of each at the center of the bolster is:

For T^1 , $5,000 \times 50$ equals 250,000 inch-pounds.

For T^2 , $5,000 \times 35$ equals 175,000 " "

A total at the center of .425,000 " "
or the equivalent of 425,000 pounds applied 1 inch from the center of the bolster, or about 35,400 pounds placed 1 foot from the center. Assume, now, that the truss rods are located at T^3 and T^4 , the latter being 30 inches from the center, a very reasonable location; then the moments at the center are:

For T^3 , $5,000 \times 35$ equals 175,000 inch-pounds.

For T^4 , $5,000 \times 30$ equals 150,000 " "

A total at the center of .325,000 " "
or the equivalent of 325,000 pounds placed 1 inch from the center, or about 27,000 pounds placed 1 foot from the center.

The error must not be made of assuming that the improved condition is always as great as would be indicated by the difference of the two total moments given above; this amount and more can be gained by suitable arrangement, but the method of attaching the needle beams and the designs of them must be suitable if so much improvement is to be made.

The Needle Beams.—Reference will be made to Fig.

of the other parts will allow. The other parts referred to are the end sills and the needle beams, both of which are used to distribute the trussing over all the sills.

It will probably be considered inexpedient to do all the trussing with rods placed between the center sills; still, it is quite possible to place one truss rod immediately outside of each sill, and this will not be contrary to the general statement made above, because rods so placed will, generally, rest on the bolster within the radius of the bearing surface of the center plate. This will suggest two arrangements, viz.: One, that the center sills do not bear on the needle beams, but that these sills be trussed independently of the main needle beams by means of secondary needle beams extending, to advantage, across the intermediate sills. With such an arrange-



Fig. 2.

ment, however, dependence must be placed in the flooring to make the sills act together, or other desirable means should be provided for the same purpose. The second, and probably the better method, is to locate a truss rod either inside or just outside of each center sill, and another truss rod at the inside of each intermediate sill, or even closer to the center of the bolster if found expedient to do so, all four truss rods to bear on the two needle beams, as is ordinarily the case, but these beams to be designed so stiff that they will not bend between the two outside truss rods with the load imposed by the side and intermediate sills.

The End Sills.—Unless some consideration has been given the question, it may be difficult to understand

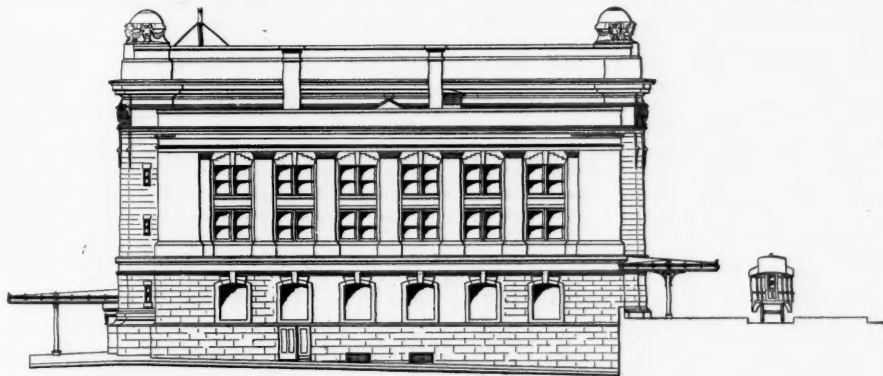


Fig. 4.—Albany Union Station, South End.

2 in explanation. Ordinarily, all the sills rest on the needle beams, and Fig. 2 will show that although the needle beams may transmit a part of the load from the side sills to the truss rods, and the latter deliver the same nearer the center of the bolster, there may be a considerable part of the load from the center sills similarly transferred to the truss rods, and by them delivered to the bolster at a point further from the center of the bolster than would be the case were no trussing used. Now, as to how the advantage indicated above, or a greater advantage, may be gained. It is clear that the side sills should rest on the needle beams and the latter on the truss

"at a glance" how the end sills can be used to change the distribution of the load on the bolsters, and it may be necessary to explain this further. The advantage derived from trussing the longitudinal sills is due to the fact that when trussed these sills carry the load partly as columns and partly as untrussed beams; in order to take advantage of the former principle it is necessary to provide the strut or struts in the middle, the needle beams, and to distribute the truss rod strains over the ends of the longitudinal sills so as to put these sills in compression.

In freight equipment it is usual to extend the truss

rods to the outer face of the end sills and distribute over the ends of the longitudinal sills, by means of the end sills, the stresses incident to the use of the rods; the end sills, therefore, must be of sufficient stiffness to make the distribution properly. Therefore, as the truss rods are moved toward the middle of the car, the end sills must be made correspondingly heavier. The ends of the end sills, extending from the truss rods to the side sills, are of the same class beam as the needle beams, and calculation for the strength of each is made in the same way, and any change in one, made necessary by change in location of the truss rods, must quite certainly be provided for in the other.

The Upper Framing.—If the car under consideration has an upper framing, unless there is something different from ordinary car construction there is not much that can be done with it that will affect the bolster. The side frames probably cannot be manipulated to affect the distribution on the bolster, but it is possible to adjust the end framing to advantage. For instance, the diagonal bracing at the ends generally extends from the upper end of the end posts, or from near the middle of the end plates, to the lower end of the corner posts; these braces are compression members, the connections being made in such a manner that if the braces assist in carrying the roof load to the sills they must be in compression, and are, therefore, transmitting some of the load which would naturally be transmitted to the center sills, to the side sills. If it is considered necessary to put in these braces in the usual manner, rods extending parallel with them and adjacent to them might be secured to the side sills and to the end plates near the middle of them, and through these and the end posts a part of the load overhanging the side sills be transferred to the overhang of the center and intermediate sills.

In the reference to the longitudinal sills above, it has been assumed that all the sills were of equal section; sometimes some of the sills are made of heavier section than are the others, and quite generally the side sills have been selected for such increase; there are occasions when there is no choice only to make the side sills the heavy ones, but this should not be done when it is possible to gain the same advantage by making the center preferably, or the intermediate sills, the heavy ones. If some sills are to carry heavier loads than others, such heavier sills should be located as near the middle of the bolsters as possible. By suitable connections between the sills and the needle beams the heavier and stiffer sills can be used to advantage, even to assist in supporting lighter outside sills. Many of the remarks made above will apply equally well to the cars designed for special loading, as, for instance, such cars as are designed for loading suspended from the roof. The side sills of such cars are heavily taxed, and because the sills deliver the load at the extreme ends of the bolsters use should be made of everything that will assist in delivering the load to the bolster at a point nearer the middle. If some sills are lighter than others, and the lighter ones spring sufficiently to get out of line with the others, or bend downward, then the flooring may affect the distribution of the load to the bolsters; if the side sills deflect more than the other sills, the flooring will transmit to the intermediate sills a larger portion of the load than did all sills deflect together, and this would favor the body bolsters. Contrary would be the case were the side sills the very stiff ones.

The Texas Freight Rate Injunction.

On Oct. 6 last the Texas Railroad Commission promulgated a tariff reducing freight rates on cotton throughout the state. Suits were brought in the United States Circuit Court for the Western District of Texas by the Trustees of the mortgages of the Houston & Texas Central, the San Antonio & Aransas Pass, the Gulf, Colorado & Santa Fe, the Texas & Pacific, the Galveston, Harrisburg & San Antonio, the International & Great Northern, the Missouri, Kansas & Texas, and the St. Louis Southwestern railroads, praying for an injunction restraining the several roads from putting into effect, and the Railroad Commissioners and the Attorney-General from enforcing, the reduced rates.

The bills of complaint, which are substantially similar, aver that the rates voluntarily made by the railroads were reasonable, and that the rates enforced by the Commission and proposed to be enforced are lower than the rates disapproved by the United States Supreme Court as too low in previous suits against the Commission (in 1892), and that under the proposed rates the net earnings of the roads would be insufficient to meet running expenses and necessary improvements and renewals; that the estimates of the Commission as to the value of railroads are based on fictitious conditions, and are unreasonably low. The bills further set up the act of 1853, allowing the roads 12 per cent. revenue on capital stock, which it is claimed is a part of the charter rights of the corporations which should be protected under their constitutional rights.

The answer of the Commission denied substantially the allegations in the bills, and set up that the val-

uation of the properties fixed by the Commission were based upon careful and reliable examinations.

Judge McCormick, sitting at Austin, on Dec. 1 issued an injunction restraining the roads from putting into effect any rates fixed by the Commission since Aug. 10, 1894; restraining the Commission from enforcing any rates made since that date; restraining the Attorney-General from bringing suits against the railroads to enforce any rates made by the Commission since that date, and protecting the railroads against any suits brought for recovery of damages or overcharges by shippers.

The main difference in the contentions of the roads and the Commission is in the valuations of the property fixed by each.

The Commission has determined upon a certain valuation and fixes its rates upon a schedule which it claims will yield a fair return to the owners of the property. The roads contend that this valuation is far too low, and therefore the rates fixed are entirely unreasonable and unjust. The Court considered especially the Houston & Texas Central. The Commission valued this road at \$21,000 per mile. The attorneys for the bondholders averred that it should be \$62,000. On this point the Court said, in part:

It seems clear from the answer of the Commission, and the argument of the Attorney-General, that in estimating the value of the Houston & Texas Central no allowance was made for favorable location in view of the advance in the prosperity of the country through which it runs, and the increment to its value due to the settling, seasoning, established business and good will connected with the business through a long series of years, all of which ought reasonably to be considered in fixing the value of the property and the capitalization upon which at least it is entitled to earn, and should pay, some returns by way of interest or dividends.

As popularly expressed, the rights of the people have to be regarded, but, as judiciously expressed, these last have to be so regarded as not to disregard the inherent and reasonable rights of the projectors, proprietors and operators of the common carriers. It is settled that the state has the right, within the limitations of the constitution, to regular fares, but neither at common law nor under the railroad commission law of Texas can the courts or the Commission compel the carriers to submit to such rates as will so reduce the earnings below what reasonable rates would produce, as to destroy the property of the carrier or appropriate it to the benefit of the public.

In countries conditioned as Texas has been and is, such a railroad property and business cannot be reproduced except substantially in such manner in which this has been produced, that is, by a judicious selection of location, by small beginnings and gradual advance through a number of years, more or less, of unproductive growth. And a system of rates and charges that looks to a valuation fixed on so narrow a basis as that shown to have been adopted by the Commission, and so fixed as to return only a fair profit upon the valuation, and which permits no account for betterments made necessary by the growth of the trade, seems to me to come clearly within the provision of the fourteenth amendment to the Constitution of the United States, which forbids that a state shall deprive any person of property without due process of law, or deny any person within its jurisdiction the equal protection of the law. It is true that railroad property may be so improvidently located, constructed or operated that reasonable rates will not produce any profit on the investment. It is also true that many railroads not improvidently located, constructed or operated, may not be able to earn even running expenses. The estimate made on behalf of the H. & T. C. of the cost of the railroad property and the business of that company as it exists to-day may not be exactly accurate, but it seems to me that it is not beyond the fair value of the property as it is shown to have been built up and constituted and to exist to-day as a growing business concern, and that such rates for passengers and property as are reasonable, considered with reference to the cost of the carriage and the value of it to the one for whom the service is rendered, cannot be reduced by the force of state law to such a scale as would appropriate the value of this property in any measure to the use of the public, without just compensation to the owners thereof.

On the whole case, as made in the case of the Houston & Texas Central, it seems clear to me that the rates adopted by the Commission do not afford to the owners of this property equal protection of the law. The tariff takes from the owners and stockholders the property they have therein without just compensation, and therefore the rates must be held to be unreasonably low, unjust and confiscatory, and cannot be suffered to be enforced.

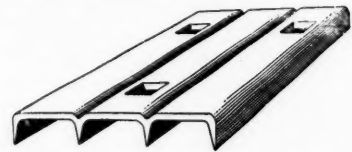
The Court in conclusion said that the case made for relief in each of the other suits seemed stronger than in the case of the Houston & Texas Central, and the evidence appeared to show clearly that the rates imposed are as to each of the roads unreasonably low, unjust and confiscatory.

The case will go to the United States Supreme Court on appeal. As the injunction is granted as to practically all the roads in Texas, the Commission is

powerless to enforce the present rates or make any new rates lower than those in effect Aug. 10, 1894; and the roads themselves are enjoined from charging any lower rates than those in effect on that date, unless the Supreme Court reverses the decision of Judge McCormick and sets aside the injunction.

The Q & W Tie Plate.

A considerable demand has developed for a corrugated tie plate with side flanges, and this result will be attained by combining the Servis and the Wolhaupter patents. A new company has been organized to work these patents, known as the Q & W Company. The Q & C Company and the Railroad Supply Company will be the sole licensees of the patents owned by the Q & W Company, and will each be authorized to make and sell Servis plates and Wolhaupter plates and also the new Q & W plate. These companies say that the sales of Servis and Wolhaupter plates during the past two years have reached 40 millions, or sufficient to plate every tie on 8,000 miles of road. Each has its merits and its advocates, and it has been thought wise to combine the main features of the two plates, and the result is shown in the Q & W tie plate illustrated herewith.



The important feature of the Wolhaupter plate is the distribution of the metal, which is such that the wearing surface can be maintained at a given thickness, and the weight of the plate kept down to the minimum.

The Servis plate possesses the great merit of being able to fasten itself to the supporting tie by the side flanges. In this manner of rolling a plate these side flanges can be made deep and at the same time be so thin that they will readily enter between the fibers of the tie. In entering the tie these flanges are spread slightly and dovetail themselves into the tie, thereby rendering it practically impossible for the plate to rise under the traffic.

Recognizing the importance of the strength, life and lightness of the Wolhaupter plate, and the holding power of the outer flanges of the Servis plate, many railroad men have conceived the idea that a combination of these two features would result in the production of a perfect plate, and hence the new plate.

Case of Railroad Tracks.*

By far the greatest proportion of the entire mileage of railroads is laid with what is often termed the "standard gage," 4 ft. 8½ in. This particular width seems to have been adopted by chance rather than design. After railroad construction had become of such importance that engineers could devote time to the study of details, many other gages were introduced and experimented with.

Brunel adopted a width of 7 ft. Many other prominent engineers agreed with Brunel, while others followed the Stephensons in their belief that the gage already in use should be made the standard. After a long and bitter fight, in Parliament and out, the ideas of the Stephenson party prevailed and their standard was adopted.

Practical experience has shown in most instances that narrow-gage railroads built in countries where standard gage systems already existed have proved that the cost and trouble of transfer of freight and passengers and the increased cost of operating have made it advisable to incur the expense of changing to the standard gage.

In new countries where no railroads already exist it does not make so much difference as to the gage adopted, although even under these conditions the standard or even a little greater width, say 5 ft., gives the best proportions for the economical maintenance and operation.

Discussion by Prof. C. F. Allen.

I found myself interested in what Mr. Turner said in relation to the gage of the track, partly for the reason that one of my students a few years ago saw fit to take for his thesis a consideration of the narrow gage as compared with the standard gage. His investigation was analytical in character, taking up many details, and after a thorough consideration of the subject his conclusion was distinctly to the effect that, taking cost and operating expense together, the narrow gage was not more economical than the standard gage, but, on the contrary, if a variation was to be made from the standard gage, it should be made in the direction of a wider rather than a narrower gage. His conclusions seemed to me to be correct, purely upon the merits of the case. The paper investigated the subject apart from a consideration of the difficulty of interchange of traffic, which in itself has been a strong argument in favor of the

*From a paper by Mr. E. K. Turner, before the New England Railroad Club, Nov. 8, 1898.

standard gage. It occurred to me that a word on this point might be of value, although the practice in this country seems to be pretty well established; the mileage of narrow gage railroads has not materially increased in later years, and there have been many cases where narrow gage railroads have been changed to standard gage.

The New Dry Dock of the Newport News Company

The Newport News Ship Building & Dry Dock Company is building a second dry dock, the dimensions and construction of which are shown in the engravings. This dock was designed by Mr. W. A. Post, General Superintendent, and is building under his supervision by the company's men.

The dimensions finally decided upon are: Clear length inside the caisson, 806 ft.; breadth on bottom, 80 ft.; breadth at top, 162 ft. The entrance will admit any vessel that can be accommodated inside the dock. The depth over the sill is 30 ft. at mean high water; mean range of the tide, 2.6 ft.

The entrance abutments will be of concrete, faced with granite. The bottom of the dock will be of concrete over piling. The interior will be of timber. The caisson will be of steel, and operated with trimming tanks, so arranged that it will not be necessary to pump out the water ballast.

The pumping plant has been designed to empty the dock in two hours, which is at the rate of about 200,000 gals. per minute. There are two centrifugal pumps for emptying the dock, each pump having a suction and discharge area equivalent to 58 in. in diameter. Each pump is driven by a compound steeple engine having cylinders 21 in. and 42 in. by 30 in. stroke. There is also a drainage pump having a suction and discharge of 18 in. diameter, driven by a 15 in. by 15 in. engine. All of these pumps are designed to work at 125 lbs. steam pressure.

Two first-class battleships can be repaired in this dock at one time, or the largest ocean liner now contemplated will have plenty of room to spare. Work on the dock was recently begun, and it will be pushed ahead as rapidly as consistent with good work, and a thorough consideration of the details of construction.

The Powers of the Interstate Commerce Commission.

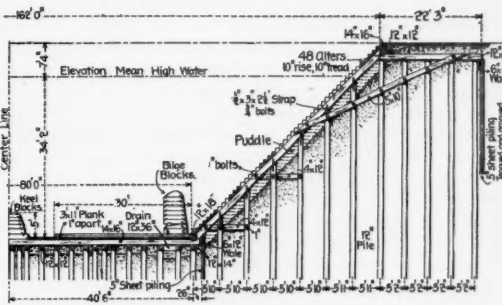
By General Basil W. Duke.

The article in the November number of the North American Review by the Hon. Charles A. Prouty on the powers of the Interstate Commerce Commission, ingeniously presents, from the Commission's point of view, the issue between those who ask and those who oppose the extension of its powers, but does not state it so fairly as might have been done by one less interested. Evidently addressed to a popular audience, it is well calculated to reach the sentiment it seeks to enlist and its suggested rebuke of the courts for having sustained any contention of the railroad corporations regarding the construction of the Act to Regulate Commerce is as sharp as is the usual censure of such corporations for their effort to

Mr. Prouty repeats a good deal that his colleagues have already said about the judicial emasculation of the Act to Regulate Commerce, and seems much pained that the people who think differently use strong language in deprecation of the legislative restoratives he wishes administered. He believes that the real meaning and purpose of all criticism of the Eleventh Annual Report of the Commission, recommending that the power which the Supreme Court has decided it does not possess shall be given it, is to discredit the Commission and confine it to a "condition of innocuous desuetude." Like other gentlemen who have held the position he occupies, he is of the opinion that unless the Commission be invested with some very positive and extensive authority to manage the business of the railroads it can in no degree assist in the regulation of interstate commerce, and that to withhold the ratemaking power which he asks—partial as he insists it to be—will render the Commission impotent for administrative and nearly so for advisory functions.

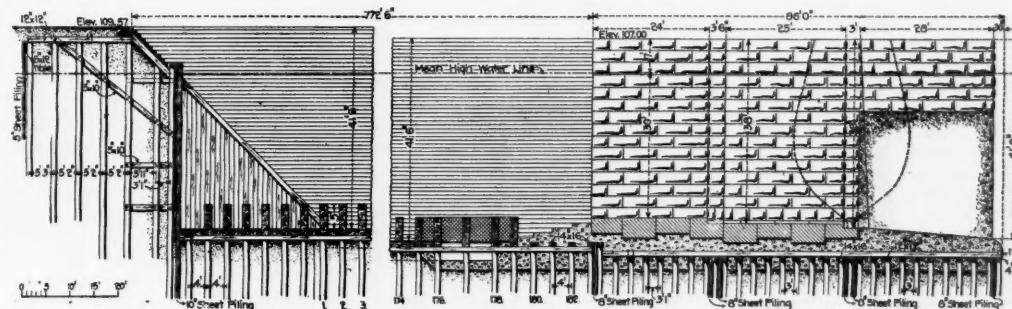
There is an undercurrent of assumption running through the article that seems intended to divert attention from the lines on which the discussion has hitherto proceeded; a manifest petitio principii is in nearly every statement Mr. Prouty makes. He says that the Commission, in the Eleventh Report, "endeavored to explain the present condition of the law and to point out the amendments which were necessary to secure to the public the benefits contemplated by the original act." There was practically no need of an explanation of "the present condition of the

well informed men generally, and an examination of the records of all kinds in which contemporary opinions of the law were expressed when its enactment was under discussion, especially of the debates in Congress just previous to its passage, disclose little, if any, purpose or disposition to confer such power. All contemporaneous testimony tends to prove that so



Half Cross Section.

far from having intended to create a tribunal so powerful and capable of exercising a control so extensive and possibly disastrous over the agencies employed in conducting the commerce of the country, over the capital invested in such agencies, and the traffic itself, as the Commission might have been had the powers it wished been granted it, the best thought given this matter, both in and out of Congress, inclined to the institution of a tribunal whose



Longitudinal Section on Center Line.

The New Dry Dock of the Newport News Shipbuilding and Dry Dock Co.

act." Everyone who had given the matter attention knew that the Supreme Court had in recent decisions declared that the Commission had no power to prescribe, in any mode or form, the prices the railroad corporations should charge and collect for transportation; that no such power could be deduced from the language of the Act and any rational construction of its provisions, but that the Commission had ample authority, by strictly enforcing the specific requirements of the Act in the manner therein prescribed, to compel "both reasonableness and equality of rates as contemplated by the Interstate Commerce Act," and fully secure to the public all

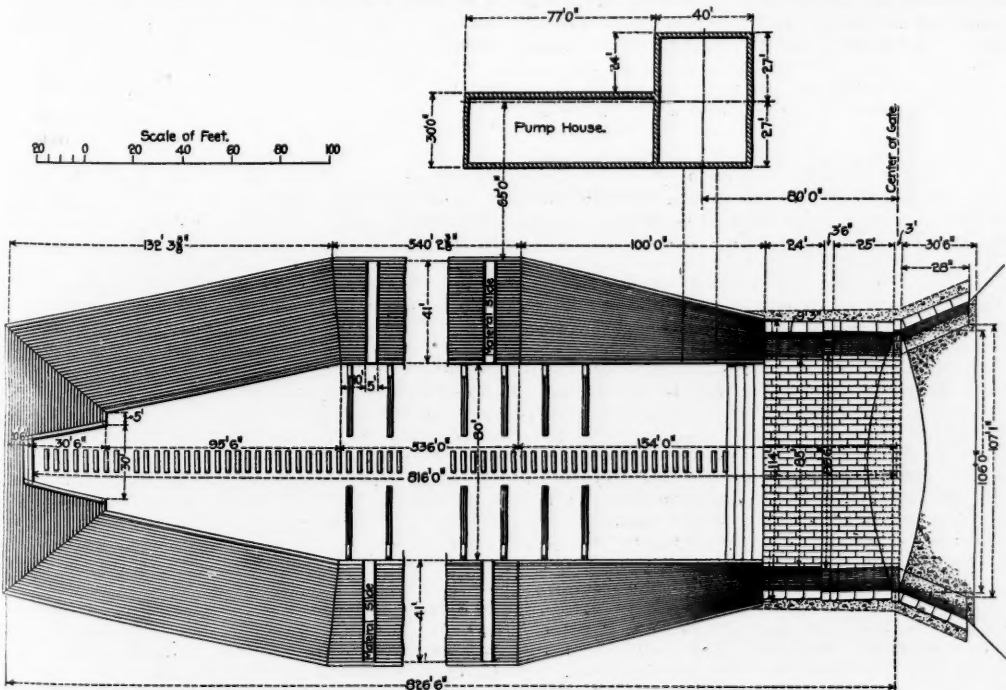
chief function should be the collection and compilation of information, and, in so far as administrative functions were to be conferred, should be chiefly restricted to the findings of facts and their presentation in a shape useful to the courts when questions involving the reasonableness of rates might come before them. In some of the earlier cases which it considered the Commission itself announced very plainly that it was not authorized to make rates. While it is undoubtedly true that in a number of instances wherein the rulings of the Commission seem to imply the existence of this power the railway corporations acquiesced in the orders made, it was for the very excellent reason that they desired no conflict with the Commission when it could be avoided without too great detriment. But this does not warrant Mr. Prouty's conclusion "that for the first five years of its existence the railways conceded" that the Commission possessed this power.

But in view of Mr. Prouty's peculiar manner of enforcing his contentions—a method already alluded to—it is advisable to state them, so far as a due regard for brevity will permit, in his own language. He says: "Mr. Walker and Dr. Nimmo assert that the Commission is seeking the full ratemaking power. I deny that any ratemaking power, in the proper and ordinary acceptance of that term, is sought. Fortunately, however, there is no need in this instance to rely upon the statement of anybody. What word properly expresses the thing asked for may be matter of discussion. The thing itself is not, and any person of ordinary intelligence can understand what that thing is."

To say that "the thing asked for" by the Commission—the power its members and advocates want it to have—is not "a matter of discussion," is a very summary way of closing all discussion of the principal and most important subject matter under consideration. It very nearly amounts to the declaration that whenever the Interstate Commerce Commission wishes and asks additional authority Congress should without question grant its demands, for certainly if it be not proper to discuss its demands it can hardly be right to refuse them.

Mr. Prouty illustrates his meaning by the case of the "Grain Shippers' Association of Northwestern Iowa vs. the Illinois Central RR. Co., and others," now pending before the Commission. The complainant ships grain from Northwestern Iowa to Chicago, and alleges that the rates on grain from that region to Chicago are unreasonable. The tariff rate on wheat from Sioux City to Chicago is 22 cents per 100 pounds. The complaint avers that any rate in excess of 17 cents per 100 pounds is unreasonable and therefore unlawful.

That the respective contentions may be clearly



Plan of the Ends.

secure judicial protection. The resentment exhibited by the Commission because of the Supreme Court's refusal to recognize its claim of right to determine what shall be a reasonable rate, when, in any case heard by it, it considers the rate previously charged by the railroad corporation complained of unreasonable, and the declaration that its power in this regard is limited to the procedure indicated by the Act, finds abundant expression in this article.

benefits originally intended. Mr. Prouty, of course, reiterates the claim that "this power is not new"; that "it can be demonstrated that in the popular apprehension the Commission always possessed this power." If we shall undertake to ascertain what the "popular apprehension" of a subject like this may have been we enter a very wide field of inquiry and one full of confusion. But such was not the understanding of the law among men in public station and

borne in mind, a more specific description of the procedure directed by the Act than Mr. Prouty has given may be not amiss. When the Commission shall have investigated this case, as the Act now directs, it will make a report in writing in respect thereto, including the findings of fact upon which its conclusions are based, with a recommendation of what reparation, if any, should be made by the parties complained of to the parties injured, and such findings will be prima facie evidence of the facts so found in all judicial proceedings wherein they may be properly used. If the Commission shall conclude that the complaint is just and the rates charged by the Illinois Central RR. Co. are in violation of any provision of the act, it will forthwith cause a copy of such report to be delivered to that company, together with a notice that it must desist from such violation of law or make reparation for the injury done, or both, within a reasonable specified time. If the company shall refuse or neglect to obey or perform any lawful order or requirement of the Commission set forth in such notice, the Commission will apply, in a summary way, by petition to the Circuit Court of the United States sitting in the judicial district in which the railroad company has its principal office or in which the violation or disobedience has happened, alleging such violation or disobedience, as the case may be. If such order or requirement be not founded on a controversy requiring a trial by jury, the court sitting in equity, the railroad company having been notified to appear and answer, will proceed to hear and determine the matter speedily, without formal pleadings and proceedings, but in such manner as to do justice in the premises. If the matters involved in the controversy are such as to require trial by jury it shall be so tried. Either party may appeal to the Supreme Court of the United States if the matter in dispute shall prove to be of the value of two thousand dollars. The decree or judgment may be enforced by appropriate process.

Now Mr. Prouty and the Commission are not satisfied with this method and measure of redress, and contend that in a case like this the Commission, if it consider the present rate unreasonable, should have the power to declare what rate the railroad company shall charge in the future between Sioux City and Chicago. Mr. Prouty insists that this power is in no sense a "rate-making power, and that it is extremely unjust to so characterize it." It is not, of course, intended to express any opinion in the present instance as to the merits of this particular controversy, but it may be assumed for the purpose of illustration that the Commission is of the opinion that the complaint is well founded, that the present rate of 22 cents is unreasonable, and, therefore, in violation of the statute, and that a rate of 17 cents would be reasonable. Now, the power which the Commission asks is to compel the carriers to charge for the future what has been determined to be a reasonable rate. It will be seen later that the decision of the Commission can be reviewed in the various courts of the United States, going in most cases to the Supreme Court.

"This is the only power over rates which the Commission asks for, and this is not the power to make a rate, but the power to correct a rate when it has, with every formality, been determined to be unreasonable."

The distinction drawn by Mr. Prouty between "making" a rate and putting in force a corrected rate, which latter shall be in effect the rate which the Commission would make if it did make a rate, is so subtle as to become almost elusive. But Mr. Prouty should not be surprised that people who object to having the Commission make rates also oppose this "thing asked for" by the Commission, and that they wish to discuss it. The complaint, so frequently heard, that the Supreme Court has "shorn" the Commission of powers it was created to exercise arises out of the fact that the Court, not noticing the nice verbal refinements which Mr. Prouty prefers, held that it could not make rates; and that to do so—to possess this "thing asked for"—is not necessary to enable the Commission to employ usefully the functions it undoubtedly can exercise. In order that the grounds on which the Court rested its decision may be perfectly understood, some passages from its opinion most strongly expressing its conclusions will be quoted, and a somewhat extensive quotation may be pardoned. It will be seen that while the opinion is confined, of course, to the question of what power the Commission actually has under the law as it is now written, it suggests cogent reasons why the power the Commission asks should not be conferred. This fact has, perhaps, more than the mere decision itself, induced the resentful feeling it has elicited from the friends of the Commission.

The Court said:

Interstate Commerce Commission vs. Cincinnati, New Orleans and Texas Pacific Railway Company, 167 U. S., p. 493:

"A similar question was before us at the last term in Cincinnati, New Orleans & Texas Pacific Railway vs. Interstate Commerce Commission, 162 U. S., 184, and in the opinion, on pages 196 and 197, we said:

"Whether Congress intended to confer upon the Interstate Commerce Commission the power to itself

fix rates was mooted in the Courts below, and is discussed in the briefs of counsel.

"We do not find any provision of the act that expressly, or by necessary implication, confers such a power." . . . We prefer to adopt the view expressed by the late Justice Jackson, when Circuit Judge, in the case of the Interstate Commerce Commission vs. Baltimore & Ohio Railroad Co. 43 Fed. Reports, 37, and whose judgment was affirmed by this Court, 145 U. S. 263: 'Subject to the two leading prohibitions that their charges shall not be unjust or unreasonable, and that they shall not unjustly discriminate, so as to give undue preference or advantage to persons or traffic similarly circumstanced, the Act to Regulate Commerce leaves common carriers as they were at the common law, free to make special contracts looking to the increase of their business, to classify their traffic, to adjust and apportion their rates so as to meet the necessities of commerce, and generally to manage their important interests upon the same principles, which are regarded as sound, and adopted in other trades and pursuits.' . . . Before the passage of this act (the Act to Regulate Commerce) it was generally believed that there were great abuses in railroad management and railroad transportation, and the grave question which Congress had to consider was how those abuses should be corrected and what control should be taken of the business of such corporations. The present inquiry is limited to the question as to what it determined should be done with reference to the matter of rates. There were three obvious and dissimilar courses open for consideration. Congress might itself prescribe the rates; or it might commit to some subordinate tribunal this duty; or it might leave with the companies the right to fix rates, subject to regulations and restrictions, as well as to that rule which is as old as the existence of common carriers, to wit: That rates must be reasonable. There is nothing in the act fixing rates. Congress did not attempt to exercise that power, and if we examine the legislative and public history of the day it is apparent that there was no serious thought of doing so.

"The question debated is whether it vested in the Commission the power and duty to fix rates; and the fact that this is a debatable question, and has been most strenuously and earnestly debated, is very persuasive that it did not. The grant of such power is never to be implied. The power itself is so vast and comprehensive, so largely affecting the rights of carrier and shipper, as well as indirectly all commercial transactions, the language by which the power is given had been so often used and was so familiar to the legislative mind and is capable of such definite and exact statement, that no just rule of construction would tolerate a grant of such power by mere implication. Administrative control over railroads through boards or commissions was no new thing. It had been resorted to in England and in many of the states of this Union. In England, while control had been given in respect to discrimination and undue preferences, no power had been given to prescribe a tariff of rates. In this country the practice had been varying. It will be interesting to notice the provisions in the legislation of different states. We quote the exact language, following some of the quotations with citation of cases in which the Statute has been construed." The Court, after an exhaustive review of the character indicated, resumes:

"It is one thing to inquire whether the rates which have been charged and collected are reasonable—that is a judicial act; but an entirely different thing to prescribe rates which shall be charged in the future—that is a legislative act. . . .

"It will be perceived that in this case the Interstate Commerce Commission assumed the right to prescribe rates which should control in the future, and their application to the Court was for a mandamus to compel the companies to comply with their decision; that is, to abide by their legislative determination as to the maximum rates to be observed in the future. Now, nowhere in the Interstate Commerce Act do we find words similar to those in the Statutes referred to, giving to the Commission power to 'increase or reduce any of the rates'; 'to establish rates of charges'; 'to make and fix reasonable and just rates of freight and passenger tariffs'; 'to make a schedule of reasonable maximum rates of charges'; 'to fix tables of maximum charges'; 'to compel the carriers 'to adopt such rate, charge or classification as said Commissioners shall declare to be equitable and reasonable.' The power, therefore, is not expressly given. Whence then is it deduced? In the first section it is provided that 'all charges. . . shall be reasonable and just, and every unjust and unreasonable charge for such service is prohibited and declared to be unlawful.' Then follow sections prohibiting discrimination, undue preferences, higher charges for a short than a long haul, and pooling, and also making provision for the preparation by the companies of schedules of rates, and requiring their publication. Section 11 creates the Interstate Commerce Commission. Section 12, as amended March 2, 1889 (25 Stat., 858) gives it authority to inquire into the management of the business of all common carriers, to demand full and complete information from

them, and adds, 'and the Commission is hereby authorized to execute and enforce the provisions of this Act.' And the argument is that in enforcing and executing the provisions of the Act it is to execute and enforce the law as stated in the first section, which is that all charges shall be reasonable and just, and that every unjust and unreasonable charge is prohibited; that it cannot enforce this mandate of the law without a determination of what are just and reasonable charges; and no other tribunal is created for such determination; therefore it must be implied that it is authorized to make the determination, and having made it, apply to the courts for a mandamus to compel the enforcement of such determination. In other words, that though Congress has not in terms given the Commission the power to determine what are just and reasonable rates for the future, yet as no other tribunal has been provided, it must have intended that the Commission should exercise the power. We do not think this argument can be sustained. . . . The power given is the power to execute and enforce, not to legislate. . . . Pertinent in this respect are these observations of counsel for appellees:

"Article II, Sec. 3 of the Constitution of the United States ordains that the President 'shall take care that the laws be faithfully executed.' The Act to Regulate Commerce is one of those laws. But it will not be argued that the President, by implication, possesses the power to make rates for carriers engaged in interstate commerce?

"The first section simply enacted the common law requirement that all charges shall be reasonable and just. For more than a hundred years it has been the affirmative duty of the courts 'to execute and enforce' the common law requirement that all charges 'shall be reasonable and just'; and yet it has never been claimed that the courts, by implication, possessed the power to make rates for carriers."

But the Court also calls attention to the provisions of Section 6 of the Act, which prescribes that every common carrier, subject to its provisions, shall print and keep open for public inspection its schedules of rates; that 10 days' notice of an advance in such rates and three days' notice of their reduction shall be given the public before either shall take effect; that it shall be unlawful for any common carrier to demand or collect from any person a greater compensation for transportation than the published rate; that copies of such schedules of rates shall be filed with the Commission; similar provisions are made with regard to joint rates. "Finally, the section provides that if any common carrier fails or neglects or refuses to file or publish its schedules as provided in the section, it may be subjected to a writ of mandamus issued in the name of the people of the United States at the relation of the Commission. Now, but for this Act it would be unquestioned that the carrier had the right to prescribe its tariff of rates and charges, subject to the limitation that such rates and charges should be reasonable. This section 6 recognizes that right, and provides for its continuance. It speaks of schedules showing rates and fares and charges which the common carrier 'has established and which are in force.' . . . It will be perceived that the section contemplates a change in rates either by increase or reduction, and provides the conditions therefor, but of what significance is the grant of this privilege to the carrier if the future rate has been prescribed by an order of the Commission, and compliance with that order enforced by a judgment of the Court in mandamus? The very idea of an order prescribing rates for the future, and a judgment of the Court directing compliance with that order is one of permanence. Could anything be more absurd than to ask a judgment of the Court in mandamus proceedings that the defendant comply with a certain order unless it elects not to do so? The fact that the carrier is given power to establish in the first instance, and the right to change, and the conditions of such change specified, is irresistible evidence that this action on the part of the carrier is not subordinate to and dependent upon the judgment of the Commission."

Not only have we here expressed in the most conclusive terms a denial by the highest judicial authority of the right of the Commission to now exercise the power under discussion, but it is difficult to realize that the same reasoning can fail to convince every intelligent and unprejudiced mind that it should never be permitted to exercise that power. To grant it would be to change the tenor of the act and reverse the legislative intent with which it was enacted; to completely annul the policy elected by Congress of leaving "to the companies the right to fix rates, subject to regulations and restrictions, as well as to that rule of the common law which is as old as the existence of common carriers, to wit: that rates must be reasonable." No argument, however specious, can controvert this conclusion.

But, while necessarily directing regulation on entirely new lines, will it not carry it farther in that direction than has ever heretofore been attempted? "The power given," says the Court, "is partly judicial, partly executive and administrative, but not legislative." To grant the Commission the power it now asks will be to concentrate in its hands power "judicial," "executive and administrative" and

"legislative"; and "the grave question Congress had to consider" of "what control should be taken of the business" of railroad corporations will be settled by virtually turning over their interstate business to the Interstate Commerce Commission. This inevitable conclusion cannot be explained away by verbal quibbles or palliated by fallacious promises of judicial relief. At present, when, after investigation and a careful preparation of the case by the Commission, the whole matter is submitted to the courts for review, the conclusion reached by the Commission will have only so much influence upon the judicial determination of the reasonableness of the rate as the report and finding of facts will warrant. But if authority to determine the rate be given the Commission, its conclusion will be invested with such sanction that no court will choose to disturb it. Than to do this, it would be better to entirely deprive it of inquisitorial and administrative functions and make it, in the fullest sense of the term, a court to try the kind of cases it now investigates and restricted to judicial inquiry and decision.

(To Be Continued.)

Railroad Signals.

By E. K. Turner, M. Am. Soc. C. E.

[From a paper read before the New England Association of Railroad Superintendents at Boston, Dec. 5, 1898.]

It is for the interest of both parties—the companies making signal apparatus and those buying it—to have the best possible material and workmanship in everything pertaining to signals. The same standard of excellence which has been adopted for automatic train brakes and has made them a success, must be followed for automatic signals, and equal attention given to their maintenance. When these conditions are reached there will be no more reason for refusing to use automatic signals and depending upon them than for refusing to use the automatic brake. The most important consideration in railroad operation is safety, but generally in this country the more advanced methods of working have been adopted only after the need has been proved by costly accident and when public demands have become too strong to be longer ignored. Then there is a tendency on the part of both the public and the press to ask for more than most railroads are able to grant, to demand that every possible safeguard be adopted without regard to cost or other considerations. To yield to such a demand would in many cases mean bankruptcy to the railroad company. . . . On roads favored with a large and profitable business it is wise and economical to adopt the best even if it is the most costly. But where traffic is light, some of the simpler and less costly appliances can be used with advantage and give good results. . . . In England the rigid rules adopted by the Board of Trade have prevented the building of many railways which would serve communities having a light business which could not yield large returns. Recently laws have been passed permitting light railroads to be built under less costly requirements, but even the light railway laws would be too exacting in this country.

On railroads with heavy traffic and frequent trains running at high speed the signal problem is not a question of safety alone, but one of ability to handle the business. Without proper signals it is impossible to move trains promptly at short intervals.

In many cases a good signal system may do away with the necessity for additional tracks which otherwise must be built. In the vicinity of large cities the additional tracks, with the land required, might cost an amount which would pay many times over for the necessary signals, and thus a sum could be saved, the interest of which would in a few years, if growth continued, provide the additional facilities needed. At large terminal stations in large cities, where the value of land is very high and the requirements as to construction and maintenance very expensive, anything that permits the business to be done well in a smaller space is of the greatest importance on the score of economy. A good signal system with proper interlocking appliances enables a greatly increased movement of trains with safety, as compared with a station not so equipped. In fact, at many large terminals it would be absolutely impossible to handle the business under the old conditions which prevailed before modern interlocking was brought into use. The modern method of operating a station yard is also to be commended because it removes the men from a dangerous work at the switches, where they are liable to be struck or run over by engines and cars. The number of men killed or injured in railroad yards is a matter of serious consideration. The same conditions prevail in the largest freight yards.

Form.—The semaphore is preferred to other forms. . . . On German railroads, the blade of the semaphore is somewhat different from that in general use in this country; the blade is of metal, with sides parallel to a point near the outer end, where it expands to a shape nearly circular. Openings are left through the blade, making it lighter and offering less surface to wind pressure. The blade is so arranged that safety or caution signals are given by raising the blade from its horizontal danger position instead of lowering it, as is the common practice here. There are many arguments in favor of such movement of the blade; it

is more easily distinguished when raised from the mast than when lowered into a position near or in front of the mast: it requires no counterweight, thus making the moving parts lighter and simpler; it assumes the danger position by force of gravity if any of the connecting parts break; as long as the blade itself remains in place it will be at danger whenever any of the moving parts of the apparatus give out, while with the counterweight blade, if the counterweight is broken off, the blade takes the safety position. The advantages possessed by the German form should receive attention here.

For night signals, lanterns of different colors are generally used. Red is almost invariably used for the danger indication. The writer believes that the use of white for safety is entirely wrong, and that the practice should be changed to green for safety and white for caution. White lights are constantly met at points so near the railroad that they can easily be mistaken for signals and lead to accident. If a colored lens be broken and the light shows white, then, if white indicates safety, the train will be lured on to accident. There are several cases on record of red lenses being broken and the signal showing white or safety when it should indicate danger. The principle that signals should always be so constructed that they will go to danger position whenever there is any defect or breakage in their parts or connections demands that we discard white as the safety color. The feeling among railroad managers that a change should be made in the use of green and white lights seems to be increasing. It is to be desired that such a change be made and that it be done at an early date. Anything that leads to danger should be discarded as soon as the fact becomes evident, before trouble is caused by its continued use.

In the use of signals, especially night signals, it is absolutely necessary that all trainmen and others to whom the signal indications are made, should have no defect of vision. Color blindness, while not common, is frequent enough to require care on the part of those having charge of men.

Uniformity.—It is of great importance that signals be uniform, or rather that the indications be uniform. Until within a few years, each railroad has made its signals and signal rules without regard to those of other roads; but now interchange of trains between different railroads is so common that it is of the greatest importance that everything pertaining to train movement should be uniform. Uniformity can and probably will be brought about by agreement between the railroads, without the intervention of any department of government.

In putting signals into use prompt and certain obedience by the men whose movements are governed by the signal is absolutely necessary. Without this, good signals may be of little service. No rules should be made which cannot be strictly obeyed, and no departure from the rules should be tolerated. Every failure should be followed up and the proper remedy applied promptly. This can be done by having proper reports of all failures either of the signals to work or of the men to obey the signals. . . . Adequate reports of failures afford a basis for comparing the efficiency of different types of signals and furnish a standard for future guidance in buying. Generally the railroad manager has no time to follow out in detail the working of signals and must obtain his knowledge of results from the tabulation of reports. Hence proper attention to devising a good system of reports, with care and skill in placing the results in convenient form for use, is essential to the best usefulness of any signals.

Acoustic signals, such as bells, gongs, torpedoes and similar devices, have the advantage of forcing themselves upon the attention. At crossings with highways, bells and gongs for notifying persons on the highway of the approach of trains should always be of the best obtainable form and maintained in the best possible manner, as signals of this kind once used lead persons passing on the highway to depend upon them, and when out of order they may prove traps and cause accident. It is far better not to install such signals than to put them into use and then neglect them.

A danger signal should never be passed without stopping. When men get the habit of passing danger signals under permissive rules, they are liable to pass those that require a stop to be made. The only safe course is to have danger signals mean STOP whenever and wherever they are met. The trainmen thus acquire the habit of obeying them and do not have to exert any mental effort before making the proper movement. Whenever it is necessary for a man to consider the question whether the signal that he is approaching means "stop" or "caution," there is a chance for error and accident. The signals should be so arranged and so ordered that the proper movement will be made by force of habit.

Where home and distant signals are used, the distant signal should have two indications—"caution" and "clear." The position of the blade for "caution" should not be the same as that of the home signal for "stop," as is so commonly the case. If three positions of the blade; viz., "vertical, an angle of forty-five degrees and horizontal, indicate "clear,"

"caution" and "stop," the same positions should have the same meaning for both classes of signals. Any departure from this principle of having the position of a blade or the presence of a color mean always the same thing gives rise to uncertainty, possibly only for an instant, but long enough, perhaps, to cause serious results. This matter of having all signals give the same indication is of greater importance, in these days of large railroad systems and consolidations of small railroads, than ever before. Men are liable to be taken from one portion of the system and assigned to duties on another portion, without sufficient opportunity to learn the differences. In such cases it is of the greatest importance that signals have the same meaning wherever they are placed.

To sum up, the requirements of a good signal system are:

Good materials and workmanship in construction and installation.

Clearness of indications.

Uniformity.

Care in maintenance and in recording the performance of signals.

Electric Railroad Building in Havana.

A cable dispatch from Havana Saturday announced the beginning of the tearing up of the streets by the American Indies Syndicate, and the representatives of this company expect to push their work forward, giving Havana modern street railway facilities. The Spaniards are granting franchises right and left with the utmost prodigality before the evacuation, and some of these have fallen into strong hands, but the story is that our Government has now called a halt. There is now a horse railroad system in Havana, the Ferro Carril Urbano, but not only has it been giving wretched service, but its line is so badly located that it does not reach the vital points of the city. The American Indies Syndicate is owner by purchase of the Torres grant, so called from its obtainer, the Marquis Torres, giving the exclusive right in many streets of Havana named in the concession, making a line about 12 miles long. This line, unlike the older street car system, will reach the harbor on the east at the ferries and go far beyond the older system on the west. It includes nearly all of the streets in the business, and consequently the more profitable, portion of the city, and on the west forms a belt, securing ease and economy of operation.

The stock of the Ferro Carril Urbano is on the market, and several would-be purchasers of it have endeavored to secure an enlargement of the franchise in these last days of Spanish occupation, and there have been some statements in the press that the plans of the American Indies Syndicate were to be defeated, but this the latter denies and points to the fact that it has already begun work as evidence of its confidence in its franchises. It may be stated incidentally that this company further claims an exclusive right, granted by the Government of Spain, for five years from 1897, to use the trolley in Spain or any of her colonies. The street railroad lines will be of the ordinary American overhead wire type.

This syndicate is incorporated under the laws of the state of New Jersey with wide powers, not only embracing the building and exploitation of railroad lines, but other development in the United States' lately acquired possessions. It has a capital stock of \$18,000,000, and the Directors are the following: P. A. B. Widener, Robert A. C. Smith, Thomas Dolan, W. L. Elkins, Anthony N. Brady, Thomas F. Ryan, Frederick P. Olcott, H. G. Runkle, Juan M. Ceballos, Henry P. Booth, Henry D. Macdonald and Guillermo De Zaldo. They have recently contracted with the United States Government to build a military road from Tricornio on the harbor of Havana to the camp of Regall, which will connect with the Matanzas branch of the United Railways of Cuba. This line will be seven miles long and be built in accordance with the best American practice and have at its eastern end a wharf about 400 ft. long, the material for which is being sent from the United States. All of the timber has to be creosoted on account of the teredo.

The representatives of the syndicate lately returned from Cuba report that there is considerable confusion in Cuba, but that the United States Government is expected to restore order promptly after the Spanish evacuation.

Foreign Railroad Notes.

The Italian, Austrian and German railroads have united to establish a fast freight train from Naples to Munich and Berlin, chiefly for carrying fruit, fresh vegetables and the like. The time from Naples is to be 60 hours to Munich and 72 to Berlin.

"All aboard for Jericho!"—not any of the various American towns of that name, but the original Jericho-on-Jordan, in the Holy Land; for a little steamer has been placed on the Jordan, and it makes regular trips between Jericho, or the bridge near that town, and the southern end of the Dead Sea, finding patrons among pilgrims and more worldly travelers. And this profanation is due to the abbot of St. John's Monastery at Jericho.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

There seems to have been some misapprehension concerning the effect of the recent heavy snowstorm on the New York City conduit electric railroads. This may have been due to misstatements in the daily newspapers in their attempt to give plausible reasons for the delays. Among other amusing blunders, it has been stated that the source of the trouble on electric roads in New York was a want of electrical connections between the wheels and the tracks, from which it is evident that some mechanical editors did not know that the current returns to the power house by a conductor bar placed in the conduit instead of by the rails, as in an overhead trolley system. A few simple facts explain the whole of the trouble. On the evening of Nov. 26 a rainstorm changed suddenly to a very heavy snowstorm, and snow fell continuously during the night and the following day. It was a soggy fall, freezing as fast as it came down and forming on the tracks a coating of ice which prevented the wheels of the cars from making a contact with the rails, and when the motors were run the wheels turned, but the cars moved not. The difficulty was primarily mechanical, brilliantly lighted cars along the route being sufficient proof of electrical connections. The whole difficulty came up so suddenly that a temporary delay was inevitable, for the snow plows sent out would run along until they came up to a stalled car, and, not being able to push it along or get beyond it, a blockade occurred.

In regions liable to heavy snowstorms two good investments of a railroad doing a large passenger business would appear to be an underground telegraph wire and a rotary snowplow. At least, the experience of the Long Island Railroad on November 26-30 suggests this. It is true that a rotary may be needed very infrequently (the Long Island road got along all right with push plows from March, 1888, to November, 1898), but on a line where passenger traffic is heavy the losses from stoppage of traffic pile up as fast after an important track is blocked as the snow does during the blocking process, and they may very soon overbalance the entire cost of a rotary plow. Where snow falls very fast the success of a push plow depends largely on the ability of the company to run it frequently and always with thoroughly competent men; and it is no disparagement of the Russell plow to say that the inexperience of men (due to the infrequency of severe storms), or perhaps the derailment of a single freight car, may produce delays which will block the best push plow ever built. And this liability to great delay and inconvenience from a small accident is the argument which justifies the expenditure necessary to lay and maintain an underground telegraph wire. This lesson was taught in March, 1888, and it was repeated with emphasis in the region of Boston on January 31 of the present year. The very severe and costly damage done to telegraph and signal wire lines at that time was described in the Railroad Gazette by Mr. Blodgett (March 25, p. 211)

and railroad officers who wish to refresh their memory on the subject will find his article interesting reading now. One of the salient facts mentioned by him was the destruction, by the extraordinary sleet of that storm, of well-built lines on large poles which were not weakened by age. Great improvement can be made in most telegraph lines by using larger poles, set nearer together (and, for the safety of trains, set farther away from the track), but the only practicable complete protection from the worst storms is a wire on or beneath the surface of the ground. And the difficulty in communicating with the snowbound trains on the New York-Boston lines in last month's storm is a reminder that besides the possible saving of actual passenger earnings, a never-failing telegraph line has value as a means of keeping the public fully informed of passenger movements and therefore friendly to the railroad. And now that we are branching out into a great "imperial" military nation, it may be well to consider the strategic uses of buried telegraph wires—at least along the coasts and frontiers.

The House of Representatives at Washington passed the Anti-ticket-scalping bill on Dec. 7 by a vote of 119 to 101. There was a long debate, but Mr. Sherman, of New York, the member in charge of the bill, exhibited a large album full of fraudulently altered tickets which had come from scalpers' offices, and this, with the forcible arguments heretofore presented, carried the day, though not without powerful opposition. The bill is in substance as follows:

Section 1 requires all ticket agents to show proper authority for sale of tickets.

Section 2 restricts passenger officers from supplying tickets for sale to other than authorized agents, and provides for the resale of transferable tickets for personal use in the prosecution of a journey.

Section 3 provides punishment for any person who may violate the act.

Section 4 compels a proper and safe redemption of a whole or partly used ticket, and provides redress to aggrieved party in case of failure to redeem.

Section 5 provides that refusal by railroad officers to promptly redeem tickets shall be a misdemeanor and subjects them to fine and imprisonment.

Section 6 provides fine and imprisonment for counterfeiting or forging transportation.

Mr. Sherman stated that over 3,000 petitions, bearing 100,000 signatures, had been received in favor of the passage of the bill.

The news of this action in Congress produced varying results. At Cincinnati the ticket-brokers met and resolved to send a strong lobby to Washington to side-track the bill in the Senate. At Chicago a scalper's office celebrated the event by giving up some stolen passes to detectives who took them unawares with a search warrant. Governor Pingree of Michigan threatened to cause the political death of every Congressman from that state who voted for the bill. Senator Tillman, of South Carolina, declared that the bill could not pass the Senate because the Senators believe that scalpers live by the encouragement of "the railroads." The fact that there are two kinds of railroads, and that this law is asked for by the better kind, appears not to have come to the knowledge of Mr. Tillman. The only really sober comment that we have seen which is unfriendly to the bill is that of Representative Gillett, of Massachusetts, who says he "regards its constitutionality as very doubtful, in view of recent decisions of the courts of New York; while it is injudicious, because it provides a criminal law to assist the railroads in preventing what they themselves could prevent if they would live up to their agreements." Here again we see the ever-recurring opinion that the railroads as a whole are a single body. That one road may desire to live up to an agreement while another may refuse to do so, and no one can devise a way to coerce it, is a situation which many Congressmen and editors seem utterly unable to apprehend. On what ground of equity can Congress compel a law-abiding road to suffer because its competitor breaks the law? As to the opinion of the New York Court of Appeals on constitutionality, that opinion does not apply to the Federal law. As we showed two weeks ago, that decision is based on what are really minor features of the New York statute, and is contrary to strong decisions by equally high courts in other states.

One Congressman (Mr. Mann, of Illinois) said in the debate that there were some weak roads which would not be able to compete with their strong rivals, except through the agency of the ticket brokers; this legislation was in the interest of the largest and strongest railroads. Precisely; it is to favor those roads which sell tickets at their own offices at published rates, and to curb those which

sell through the brokers for the purpose (and for no other purpose) of cutting under the published rates, and thus violating the plainest provision of the law. Mr. Bland, of Missouri, said that the purpose of the bill was to legalize pooling of passenger traffic, and to take away from the states as far as possible jurisdiction over this subject. But there is nothing in the terms of the bill concerning pooling, and it is impossible to legalize pools without repealing the fifth section of the Interstate Commerce law. If Mr. Bland said what he is reported to have said, he was simply careless. What jurisdiction has any state, in this matter, which Congress has the power to take away? Mr. Corliss, of Michigan, said that this bill would simply transfer the right to discriminate from the scalper to the authorized agent. He gave notice of an amendment he would offer to make any authorized agent of a railroad equally liable with an unauthorized agent for selling tickets below published rates. This, again, is an unnecessary argument, for the authorized agent is already liable to punishment for discrimination; with the difference, as between such an agent and a broker, that the agent is vouched for by a responsible railroad company.

The Effect of Truss Rods on Car Body Bolsters.

Heretofore the truss rods of freight cars have only been considered as a means for trussing the sills so as to increase their stiffness, but in the paper on car framing, presented at the Western Railway Club by Mr. F. M. Whyte, it is proposed to assign to them a new function, that of aiding the sills in the distribution of the load on the body bolsters. Extracts from this paper will be found elsewhere in this issue. Briefly stated, it is proposed to transfer loads by the truss rods from near the ends of the bolster to points nearer the center. If this idea can be carried out without seriously disarranging other parts of the car, it would seem to be of importance first to know how much the bolster can probably be favored in this way; this point the paper does not discuss. It is evident, however, that, with the usual arrangement of sills, truss rods and needle beams, the effect on the body bolster of placing the truss rods without the center sills, but nearer the center line of the car than is the present practice, is quite small, and the statements made under the heading of truss rods, while evidently clear to the author, may prove misleading to those who read the paper hastily.

Thus, by considering only the loads brought on the bolster by the truss rods and their respective lever arms, it would appear that the bending moment about the center of the bolster is reduced about 23 per cent. by transferring the outer truss rod (Fig. 1 of Mr. Whyte's paper) from T_1 to T_2 . If, however, the loads due to the sills as well as the truss rods be taken into account in this calculation, it will be found that the total bending moment about the center of the bolster under these conditions has been reduced only by a small amount, probably not more than 5 per cent. under the most favorable assumption. Just how much this will be depends upon the assumption made as to the proportion of the load from each sill taken by the truss rods. Evidently this assumption must take into account the deflection of the sills, and in turn this deflection is so affected by the camber and the loading that it would seem desirable to know what assumption, as to the distribution of the loads between the sills and truss rods, was used in the preliminary calculations for this paper.

Those who give this paper careful consideration will find that to reduce the total bending moment about the center of the body bolster by any important amount the truss rods must all be placed between the center sills, or if the rods are without the center sills these must not bear on the needle beams. The second plan is open to many objections, and we believe Mr. Whyte does not recommend it as a practicable arrangement; the first, where the rods are between the center sills, would make necessary the use of very stiff needle beams, probably quite as heavy as the bolsters themselves, together with large truss rods and heavy end sills. Under theoretical conditions possibly 15 per cent. is as great a reduction in the total bending moment about the center of the body bolster as could be obtained were the side and intermediate sills trussed independently of the center sills. If one-third of the load were carried to the bolster by truss rods inside the center sills the total bending moment might be decreased about 30 per cent.; but should it be found necessary to use truss rods near the intermediate sills, in addition to those between the center sills, the reduction in the

bending would not be so marked. The problem presented is one which should prove interesting to car designers.

To relieve the body bolster in an important way by the truss rods, it would seem that so many parts have to be strengthened and re-designed that this method could only be used when building new cars, and that it could not be used with advantage to strengthen the body bolsters of old cars. In this connection attention is called to our issue of Oct. 28, where it was shown that in designing new flat bottom cars ample room is available for body bolsters of sufficient strength for cars of 80,000 and 100,000 lbs. capacity. Still, if additional strength can be obtained by an improved arrangement of the truss rods the results might warrant the increased expense; it should be borne in mind, however, that there is a possibility that through lack of adjustment of the truss rods all the load may at times be transmitted directly through the sills to the bolsters, which in any case should be made as strong as possible.

The Safety of the Brooklyn Bridge.

In our issues of Nov. 18, Nov. 25, and Dec. 9 will be found many facts and opinions regarding the stability of the Brooklyn bridge, set forth by men whose knowledge concerning that structure is of the most thorough character. Col. Roebling was the Chief Engineer during erection. Messrs. Collingswood and Hildebrand were the Principal Assistant Engineers, while Mr. Martin for many years has been the Engineer and Superintendent of Maintenance. The consensus of their opinions is that the bridge is safe, provided the traffic be limited to the intensity prescribed by the present regulations. Mr. Lindenthal, a high authority on suspension bridges, also maintains a similar opinion. The cause of the accident of July 29 is held by all to be due to a disregard of the regulations, whereby it was subjected to a live load of far greater intensity than its designers ever contemplated.

When a common highway or railroad bridge is to be built, it is so designed that no "if" or "provided" need be used in giving an opinion regarding its stability. Under the greatest possible highway or railroad traffic, it is absolutely safe as long as maintained in repair. The Brooklyn bridge, however, was not designed to carry the greatest possible loads, but merely highway traffic and a few cable cars. Since two new tracks were laid for trolley cars the live load has been increased by 550 pounds per linear foot if the regulation distance between them is maintained, but when the blockade of July 29 occurred this was intensified to about 1,700 pounds per linear foot. Owing to the method of attaching the stays to the towers, extra stresses were developed, causing the lower chords to fail by buckling. Mr. Seaman terms this a fortunate occurrence, because, without materially weakening the bridge, it called the attention of the public and of the authorities to the necessity of enforcing the rules for the restriction of the traffic. "If" these rules are enforced the bridge is safe, but "if" the four tracks should be fully loaded with cars it would fail.

The manner in which the bridge would probably fail under an excessive load is rendered plain from the facts given by Mr. Collingswood. First, the unusual deflection of the middle of the main span would cause an inward movement of the cables and long stays, thus throwing an undue proportion of load upon the fixed stays. Secondly, as the loading increased the stresses in these fixed stays and in their adjacent suspenders would also increase, while simultaneously heavy crippling stresses would develop in the lower chords. Rupture might first occur in these chords, as it did on July 29, but with increasing loading it is probable that one or more stays or suspenders would also break. Then the adjacent stays and suspenders would become excessively strained, and, without pursuing the argument further, imagination can plainly see the trusses and roadways, with their four lines of cars, falling into the river, while the cables remain suspended from tower to tower.

We have introduced this unpleasant picture in order to draw clear attention to the fact, which is admitted by all engineers, that the cables are the strongest part of the Brooklyn bridge. In the early days of suspension structures, and before the introduction of the stiffening truss, roadways were sometimes blown down in high windstorms, while the cables remained uninjured; this occurred as late as 1889 in the case of the highway suspension bridge at Niagara Falls. It has been stated by Col. Roeb-

ling that the cables of the Brooklyn bridge are strong enough to pull up the anchorages, hence the anchorages would fail before the cables. But long before the anchorages could give way it is almost certain that the roadways and trusses would be practically destroyed. Mr. Lindenthal states that a heavy locomotive would wreck the metal floor and trusses from end to end, while the safety of the cables, towers and anchorages would remain unimpaired. All these facts and opinions plainly show that the practical question of the security of the bridge depends not upon the cables, but upon the suspenders and stays which support the trusses, and to a lesser extent upon the trusses themselves.

The report of Mr. Martin will not prove satisfactory to all engineers, since it is almost wholly confined to a discussion of the strength and factor of safety of the cables. That the strength of a structure is measured by the strength of its weakest part is an old axiom, and as the cables are the strongest part of the Brooklyn bridge, the conclusion that their factor of safety is 3.52 under the present regulations gives no new and important information. Mr. Martin's report contains no discussion of the factor of safety of trusses, of stays, of suspenders, and of connections of stays and suspenders to trusses. As remarked in our editorial of Nov. 18, the stays appear to introduce elements not only of uncertainty, but of danger. If this is the case, their influence should certainly be considered, but this is unfortunately not done in the report. The conclusion that "the bridge is as safe to-day as it ever was" is, moreover, not at all justified, for the facts presented show that there has been a marked increase in both dead and live load, and therefore the factor of safety is to-day lower than ever before, except on the afternoon of July 29.

Mr. Hildenbrand points out that the present regulations may be maintained for months or for years, but that the time will come when the lessons taught by the accident of 1898 will be forgotten and overloading will again occur. If nothing is done in the meantime to strengthen the bridge, the results of such overloading may be confidently predicted—as the extreme result, four cables stretching from tower to tower and a few stays and suspenders hanging from them will alone bear witness to the former presence of the trusses and roadways covered with their busy traffic.

A highway bridge has not the proper degree of safety when a notice is posted at the portal forbidding the passage of more than 20 cattle at one time. A railroad bridge has not the proper degree of safety when the speed and weight of the locomotives are limited. A suspension bridge has not the proper degree of safety when the number of cars is restricted by requiring a space limit between them. The Brooklyn bridge, from this point of view, is defective, and the suggestion of Mr. Hildenbrand that it should be strengthened so as to carry any load that can be brought upon it by car and highway traffic deserves careful consideration. The plan for this will involve practically an entire reconstruction of the trusses and roadways, the introduction of new cables, the reinforcement of the anchorages and perhaps also of the towers, and the abolition or alteration of the present defective system of stays. That this can be done so as to remove all necessity for restricting the traffic, and at the same time increase the capacity of the bridge, is tolerably certain, and when it is done the structure can be said with truth to have the proper degree of safety.

But even when this bridge is made safe beyond a doubt, and when its capacity is increased as it might be increased, even then the whole difficulty will not have been solved. Simultaneously, with any work that may be done on the Brooklyn bridge, work should be pushed on the new East River bridge and on Mr. Baldwin's railroad tunnel. Restrictions as to the movement of cars over the bridge will become more and more intolerable and harder to maintain as the months and years go on, and the need for diverting traffic, not only from the bridge itself, but from its congested approaches, will become far greater; and perhaps the best result of all this discussion about the bridge will be the hastening forward of the new bridge and tunnel.

The interesting discussion which has been going on in our columns since Nov. 18 has brought out many other important points. It is urged by Col. Roebling that a recomputation of the dead load of the bridge should be made and the present stresses be further investigated, and he notes that the two middle cables carry the larger proportion of the weight. It is mentioned by Mr. Martin that since

1884 there has been a slow inward movement of all the saddles toward the middle span; this motion amounted to but little more than one inch in 14 years, but it gives some idea of the effect of the increasing dead and live loads and of the lack of perfect balancing of side and main spans. As the computations given by Mr. Martin are unsatisfactory in that they apply only to the cables, it seems desirable that Col. Roebling's suggestion should be carried out. Such computations cannot be made in a day or in a month, for they must cover not only cables, but anchorages, stays, trusses, and their connections, and include the effect of moving loads and of variations in temperature. With such data in hand our knowledge regarding the factors of safety in the different parts of the structure would be a hundred times more complete than the information now given out that the cables have a factor of safety of 3.52 and that therefore the bridge is "absolutely safe."

To recapitulate: On July 29 the excessive live load on the Brooklyn bridge caused unusual and dangerous stresses in some of the fixed stays and their adjacent suspenders, which culminated in the buckling of the lower chords and an inward motion of the south cable of over 6 in., while a drop of over 13 in. occurred in the middle of the span on that side. A similar or a more disastrous result will be produced by a similar or a greater live load. Therefore the present regulations regarding the number of motor and trolley cars to be allowed on the track must be rigidly enforced. But no bridge has the proper degree of safety when the live load is restricted, for the time may come when the rules will be disobeyed. The actual degree of safety of a bridge, even under such absolute rules, cannot be inferred from the strength of its strongest member. Hence a recomputation of the stresses in all parts of the Brooklyn bridge should be made at once. Lastly, plans and estimates should be prepared for such a reconstruction as to provide for the proper degree of safety in every member when the four tracks are fully loaded with cars and when the heaviest possible highway traffic is on the roadways and promenade. Only by such reconstruction can absolute safety be secured. But beyond all this is the necessity for other ways across the river.

The aldermen of the city of Houston, Tex., lately passed an ordinance forbidding or rigidly regulating ticket brokerage, but it has been vetoed by the Mayor. The ordinance appears to be similar in its terms to the law of New York on that subject, which has recently been declared unconstitutional, and the Mayor of Houston bases his veto chiefly on arguments similar to those which were set forth in the decision of the New York court. The Mayor makes the point, which is not without some force, that where a few of the brokers of a city secure appointments as agents of railroad companies, they thus obtain an unfair advantage over other brokers who do not succeed in getting such appointments. Technically, this is not so, for the broker receiving the railroad appointment is, presumably, acting as the agent of the railroad in all his transactions, and so is not a buyer of tickets. But the leopard cannot change his spots, and the broker who has bought and sold tickets on speculation for years, buying largely from individuals, may be regarded as not unlikely to continue the same business after his new appointment. And the fact that a railroad agency exists at one end of his counter may afford just that kind of protection against police interference necessary to enable him to run an illegitimate business at the other end.

Nearly all American railroads have much greater earnings from freight than from passengers; but very few, in a well peopled territory, have so small a proportion of passenger earnings as the Elgin, Joliet & Eastern, which has stations in several important towns within 30 or 40 miles of Chicago. In its last fiscal year this road earned 107 times as much from freight as from passengers—\$1,351,338 against \$12,581—these passenger earnings being at the rate of \$70 per mile of road, \$35 per day, and \$331 per station. Over 57 miles of the main line (East Joliet, Ill., to Porter, Ind.) no passenger train is run—at least, none is given in the Official Guide. Over 60 miles there is one train a day and over 37 miles there are two. The road is essentially a freight transfer belt line of something like 30 miles radius, extending from Lake Michigan at Waukegan, north of Chicago, around through the Fox River valley to Lake Michigan southeast of Chicago, with a branch to coal mines south of Joliet. It could never have been intended for a passenger route; but the scantiness of the travel over it, considering how well peopled and prosperous the country on its line is, will surprise many.

The season of navigation on the Erie Canal is now closed and the Journal of Commerce (New York) re-

ports that it has been a poor season. There has been a considerable volume of freight, but rates have been low. The canal brought practically no wheat to New York, the demands of the shippers in May and June being so heavy and for such quick time that the railroads got practically all of that grain. Though the canal carried less grain, in the aggregate, than last year, the amount of corn was about 1,800,000 bushels greater than in 1897 and 9,000,000 bushels greater than in 1896. The total receipts at New York of grain of all kinds, including malt and peas, from May 1 to Dec. 6, by railroad and by canal, were, in thousands of bushels:

	Rail.	Canal.	Total, Inc.
May 1 to Dec. 6, 1898.....	32,887	19,422	112,809
Same, 1897.....	98,806	22,117	120,923
Same, 1896.....	64,370	32,253	96,623

The average price received by the boatmen for wheat this year was 2.8 cents a bushel; last year it was the same, and in 1896 it was 3.7; in 1895 it was 2.2 and the year before that 3.1. Of grain for New York delivered at Buffalo by Lake vessels the railroads appear to have secured whatever share they wanted, and the report of the boatmen as to the average rates which they received for carrying by water seems to indicate that the railroads must have made a rate, for most of that which they carried, of less than three cents a bushel.

The Crandall Locomotive Bell Ringer.

Mr. E. M. Crandall, foreman of the St. Joseph shops of the Kansas City, St. Joseph & Council Bluffs, has designed a locomotive bell ringer for use either with compressed air or steam, which is now in use on the locomotives of that road. As shown by Fig. 1, this device is quite simple, and consists essentially of a cast iron cylinder, 2½ in. in diameter, which is fastened by a clamp to the bell frame. The upper end of the piston protrudes beyond the cylinder, and is joined to the piston rod by a ball and socket joint, this rod being also connected to a crank on the bell shaft; this crank is set ¼ in. off center when the bell is in the normal position, so that the device cannot fail to work by being on a dead center.

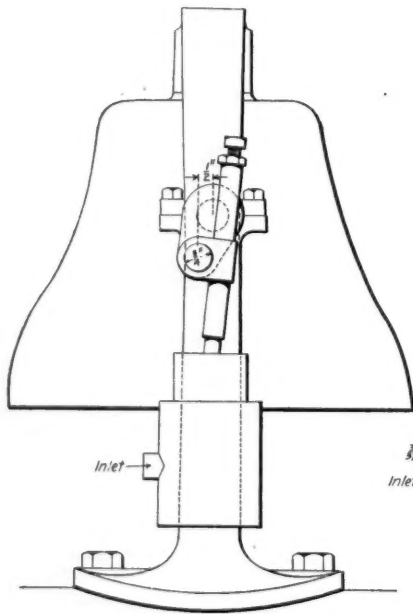


Fig. 1.

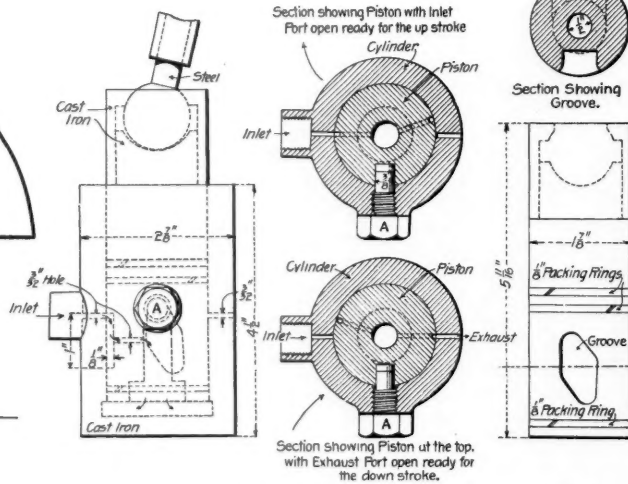


Fig. 2.

Fig. 3.

The Crandall Locomotive Bell Ringer.

Fig. 2 shows the piston in its lowest position when air or steam is admitted below the piston through the ports as indicated. The piston in moving upward is given a spiral motion, by the set screw A engaging the groove in the side of the piston; the piston in turning closes the admission ports, and as the end of the upward stroke is reached brings the exhaust ports opposite, thus allowing the steam or air in the cylinder to escape. The weight of the bell is sufficient to return the piston to the bottom of the cylinder, when the admission ports are again brought opposite and the operation is repeated. The length of stroke is about 1 in., and the details of the piston are shown in Fig. 3. The supply pipe is run from the cab to the bell ringer, and a cock is placed in this pipe convenient to the enginemen.

The First Regiment of Volunteer Engineers.

On Dec. 8 the officers of the First Regiment of United States Volunteer Engineers gave a dinner in New York to their Colonel, Eugene Griffin. Besides the officers of the regiment, a number of distinguished guests were present. In the course of an excellent speech Colonel Griffin described the circumstances which led to the organization of this regiment.

He, as a graduate of West Point, felt it his duty

to offer his services to the Government, and felt furthermore that it would be best to indicate some specific way in which he thought he could be useful. He suggested organizing a brigade of 3,500 engineers, which was at first opposed as being too large a number, but he showed that the Army of the Potomac in 1864-5 had over 4 per cent. of engineer troops; that the Army of the Cumberland had over 5 per cent.; that Sherman's Army had about 7½ per cent., and that as a rule the proportion of engineers is about 5 per cent. of the total enlisted men. This would have given 6,250 engineers in the regular and volunteer army then being organized. The suggestion, therefore, to organize a brigade of three regiments was adopted. The First Regiment began recruiting at once, and the recruiting officers rejected more than twice as many of the men offering as did the doctors, indicating something of the care taken in the selection. This regiment arrived at Porto Rico just in time for the protocol, and so saw no fighting, but it apparently did a good deal of important engineering work. The work done was outlined by Colonel Griffin, as follows:

A detailed topographical survey of the main highway from the sea through Ponce to Albonito.

A survey of the Albonito Pass, showing the locations of the Spanish batteries and intrenchments.

A detailed hydrographical survey of the harbors of Ponce and Guanica.

The rebuilding of the fine masonry bridges destroyed by the Spaniards on the military road which crosses the island.

The building of a dock and commissary storehouses.

The setting up of an ice plant and refrigerating plant for the General Hospital at Ponce and the construction of buildings for this purpose.

The building of a concreted high level reservoir for the hospital and the completion of the water supply system, including setting up the pumps, laying the pipes, etc.

The partial construction of Fort Capron, on the heights overlooking the entrance to Guanica harbor, and the building of a road up the side of the mountain leading to the fort.

The laying out of the first national cemetery in Porto Rico, and many other minor works "too numerous to mention."

The regiment sailed for home Nov. 18. It went to Porto Rico with 48 officers and 1,097 men; it returned

A little more than three years ago we reviewed the first edition of Prof. Johnson's admirable book on the law of engineering contracts and on the construction of specifications. The volume is divided into four principal parts, being: Part I., Synopsis of the Law of Contracts; Part II., Engineering Specifications and Accompanying Diagrams; Part III., Specific, Descriptive or Technical Clauses in Specifications; Part IV., Illustrative Examples of Complete Contracts and Specifications. The whole makes a volume of 452 pages, with an index. To the second edition has been added a complete set of specifications for machinery, track and overhead construction of electric railroads for cities and country towns. Mr. J. B. Arnold prepared the specifications for the machinery and Mr. Richard McCullough those for track. We do not learn that any other changes have been made in the text.

Compressed Air Production. By W. L. Saunders. Published by Compressed Air, New York. Pages 58, 5½ in. x 9 in., illustrated. Price, \$1.

This book, which is largely a reprint of articles appearing in *Compressed Air*, treats of pneumatic power and its practical applications. The author discusses the subject under the heads of (1) production, (2) transmission and (3) use. Tables for the practitioner and a few diagrams showing the properties of compressed air for different pressures and temperatures are given.

Regarding its application, the fact is brought out that the power required to compress 1,000 cubic feet of free air to 2,000 lbs. per sq. in. would be 400 h. p., consuming 1,200 lbs. of coal per hour, at a cost of \$1.80, and the cost of reheating would not exceed 22 cents to double the work done.

Any one desirous of obtaining well-grounded elementary notions of compressed air and some idea of its present and possible application, will find much of interest and value in this book.

Commercial Cuba, a Book for Business Men. By William J. Clark, with an introduction by E. Sherman Gould. Illustrations and maps. Octavo, 514 pages; index. New York: Charles Scribner's Sons, 1898. Price, \$4.

In Mr. Gould's brief and judicious introduction he says that in reading over the manuscript of this book he was "struck with the vast amount of valuable data which it contained, covering almost the entire field of inquiry regarding Cuba and her resources. These data are partly the result of Mr. Clark's personal observation during his travels in the island, and partly the result of laborious and painstaking classification of existing material collected from many and diverse sources." This pretty well covers the case. A superficial examination is enough to show that the work is designed to cover, and really does cover fairly well the whole range of topics concerning Cuba on which a business man, or a pleasure traveler, or a stay-at-home student would like to be informed.

The first two chapters concern chiefly the people, their manners, their characteristics and occupations. The third chapter is on the climate and the preservation of health, and the fourth is on the descriptive geography of the island. The fifth chapter, of 60 pages, covers in general the topic of transportation and communication and then we have chapters on currency and finance, laws and their administration, and the products and wealth of the island. After this the author takes up province by province, giving a chapter each to the six provinces and one to the city of Havana. These chapters deal more in detail with the topics which are treated generally in the preceding chapters.

The railroads are described with considerable particularity, and of course the volume gives a pretty good notion of the directions in which the railroad system of the island can be improved and extended. An appendix gives the names of merchants and other business men in Cuba, classified by towns and by the various businesses in which they are engaged.

Mr. Clark has for several years held a position of confidence and responsibility in the General Electric Company (the head of the Railway Department), and that alone is a guarantee of the intelligence and reliability of a book which must at this moment be very acceptable.

TRADE CATALOGUES.

Inspirators, Injectors and Jet Apparatus.—The Hancock Inspirator Co. of Boston, Mass., has issued a new catalogue known as '99 R.R. It is standard size, 6 in. x 9 in., with 52 pages. Four pages are devoted to half-tone cuts showing the exterior and interior of the company's shops. The other pages contain illustrations, descriptions and prices of the various apparatus made by the company, including Hancock inspirators for locomotive, stationary, marine and portable boilers; the Hancock ejector or jet pump; the Loftus automatic or restarting injector; the Park injector; general jet apparatus and specialties for steam, water, air and gas. The catalogue is well printed and the cuts used to describe the different machines are clear and distinct.

NEW PUBLICATIONS.

Engineering Contracts and Specifications, Including a Brief Synopsis of the Law of Contracts and Illustrative Examples of the General and Technical Clauses of Various Kinds of Engineering Specifications. By J. B. Johnson, C. E., Professor of Civil Engineering Washington University, etc., etc. Second edition revised. New York: Engineering News Publishing Co., 1898.

TECHNICAL.

Manufacturing and Business.

The Central Railroad of Coahuila, Mexico, of which W. E. Dorin is General Manager, with offices at 304 Tacoma Building, Chicago, is now ready to receive bids on 5,200 tons of 55-lb. rails.

The Landis Tool Co. has declared a dividend of five per cent.

C. I. McDonald, a contractor, at 708 Penn avenue, Pittsburg, wants a cable conveyor, with towers or supports 1,200 or 1,500 ft. between, something that will carry five tons with safety, and engines to operate same. This is for use in building dams on the Monongahela River, between Morgantown and Fairmount, W. Va.

John B. Hicks has resigned the position as Manager of the railroad department of the Pratt & Lambert Co., of New York.

The Weber Railway Joint Mfg. Co. has moved its offices from Cotton Exchange Building to the Empire Building, 71 Broadway, New York.

We are officially informed that the Illinois Central has ordered 50,000 tons of steel rails of 85 lbs. section from the Illinois Steel Co. These rails will be used for repairs during 1899.

Manning, Maxwell & Moore have bought the iron working tool business of the Chicago branch of the J. A. Fay & Egan Co. and will continue to represent the company for its woodworking machinery. The two concerns will be combined, occupying the building at present used by the J. A. Fay & Egan Co., at 22 to 26 South Canal street. This building has four stories and a basement, and opens at the rear to the tracks of the Pennsylvania and St. Paul roads.

Pawling & Harnischfeger, Milwaukee, have recently received the following orders through G. P. Nichols & Bro., Chicago. Two 25-ton and two 10-ton overhead electric traveling cranes for the Bethlehem Iron Co.; one 30-ton double-trolley electric traveling crane for the American Bridge Works and one six-ton crane for the power house of the Westinghouse Air Brake Co.

The Electrical Construction & Engineering Co., 412 Century Building, Cleveland, O., wants to hear from parties who can furnish about 450 tons of 60-lb. re-laying rails.

On and after Feb. 1, 1899, the firm of Wilson Brothers & Co., Architects, Civil and Consulting Engineers, Drexel Building, Philadelphia, will consist of the following members: Joseph M. Wilson, Henry W. Wilson, John McArthur Harris, Howard S. Richards.

New Stations and Shops.

The West Virginia & Pittsburgh will build new shops at Weston, W. Va. There will be four buildings, two of which will be 65 x 150 ft. and two 36 x 50 ft., one story high each, all to have brick walls and slate roofs and to be lighted by deck ventilators with sashes and slats. One of the large buildings will be used for a machine shop and the other for a wood-working shop. One of the smaller ones will be used for a blacksmith shop and the other for a power house. A contract for the buildings has been awarded to McBride, Arnold & Co., of Weston, W. Va. Contracts for machinery and tools have not yet been awarded.

The Texas & Pacific will build passenger and freight stations at Fort Worth, Tex. The passenger station will be built first on the site of the present freight station, and later the freight station will be built on the location now occupied by the temporary passenger station. The plans for the passenger station are nearly completed, but it will be some time before plans will be fully completed for the other improvements. B. S. Wathen, the Chief Engineer of the company, will have charge of the work.

We are advised by an officer of the Nashville, Chattanooga & St. Louis that the company does not expect to build car shops at Fayetteville, as has been reported.

We are officially informed that the Illinois Central does not intend to build a new union station at Louisville.

The Pittsburgh & Lake Erie will build a new station in Pittsburgh. Detailed plans have not yet been completed.

The Railroad Commissioners of Georgia, who are urging the railroads centering in Atlanta to put up a new union passenger station, have just extended for 30 days the time in which the roads may come to an agreement on a plan. Bradford L. Gilbert, the New York architect, has looked over the ground and expects to present a plan within a month.

The Schoen Pressed Steel Co. will begin building a new plant for 40 cars a day as soon as the site is decided upon. The company is compelled to get a new site, because of lack of land in the vicinity of the present location. The total capacity of both plants will be 75 cars daily.

Electric Railroads in London.

There are brisk rumors of the extension of underground electric railroads in London. One new scheme is for a line from Cricklewood to Edgware Road with a station adjoining that of the Central London

at the Marble Arch. It is conjectured that the Central London is about to take steps for carrying on the original plan of extending its line at the City end to a terminal station beneath that of the Great Eastern at Liverpool street. The Waterloo and Baker street work along the Thames above Charing Cross is going on, and it is said that work will soon be begun on the Great Northern & City enterprise. There is stir also in the Brompton & Piccadilly scheme, and it is understood that one of the great companies having its terminus in the Euston Road is about to spring a very important electric underground project.

The Siplon Tunnel.

Since the front of the Siplon at Brieg falls off rather steep to the valley, and is not covered with any considerable amount of debris, the tunnel can be begun by blasting when a distance of 20 meters has been reached. The stone is a rotten slate. Already, on the 22d of August, a length of 32 meters had been reached. A cross gallery had also been begun, which will be about 200 meters long, and then join the tunnel. This, however, is only preliminary work. The real tunneling begins when the boring machines have arrived, which are to be operated by the waters of the Rhone, day and night. A canal 7 km. long is to be built to furnish the necessary power for the work. It is expected that a minimum of 850 h. p. and a maximum of 1,500 h. p. will be needed. When once the Rhone power is instituted it is expected to make progress at the rate of 5.85 meters per day. It is reckoned that for the first year there will be excavated 1,900 meters in the two headings, 950 at each end. During this time there will also be constructed 420 meters of cross gallery, but after that time it is expected to make better progress. The contractors have every reason to expedite as much as possible the completion of the work, since they are to receive 5,000 francs for each day less than five and one-half years that the work shall be completed. The opening for traffic is to take place in the year 1906. Two hundred men are at work on the canal and the other preliminary work, and in building barracks for the workmen. The undertaking consists of three parts, viz.: the northerly approach, from Brieg to the entrance to the tunnel, the tunnel itself, and the southerly approach from Domodossola. The meeting point of the two headings is located provisionally 9,100 meters from the north portal and 10,360 meters from the south portal.

A Surface Contact Railroad at Monaco.

A surface contact electric road is now being successfully worked in Monaco, Italy. The current is led to the cars by underground cables and contact studs, which are charged only when the car is passing. These studs are placed alternately in two parallel lines, each at a distance of about 10 in. from the released rail. Automatic switches are placed at intervals of about 16 ft. along the line. The electromagnetic switches are made up of bobbins in which moves a bar of soft iron and which in turn moves an iron plate. This plate, or armature, carries three small pieces of carbon, electrically united. When this armature is raised these carbons coincide with three copper contacts (placed under the bobbin), which are insulated from each other. One of the contacts is permanently united to the principal feeder; the other two are connected respectively to the cables communicating with two successive contact studs of the high potential series, and, on the other hand, with contacts corresponding to the neighboring switches. As soon as the bobbin is demagnetized the iron plate falls and the studs, which when in contact with it are at a potential of 500 volts, naturally fall out of circuit. A magnetic blow-out placed beside the switch prevents the formation of an arc when the iron plate in falling cuts off the current. Brill cars are used on this line, and each is fitted with electro-magnetic brakes in addition to the hand brakes. The cars are arranged for first and second class passengers and have a center aisle.

The Wilson Journal Box.

The Indian and Eastern Engineer for October contains a description of the Wilson journal box used in England and being introduced on the railroads of India. In some respects it embodies features which have lately been brought out in this country. The brass is solid with a crown bearing so that it is free to adjust itself longitudinally, thus bringing the load on the center of the brass should the box become inclined; no wedge is used. Instead of waste packing, a lubricating pad, held in place by flat steel springs, extends up around the journal on either side as high as the center line and along its entire length; the pad is open at the bottom to prevent the accumulation of dirt at that point. Connected to the pad at various points are broad wicks which extend into the oil cellar in the bottom of the box, the cellar being covered by a thin metal plate to prevent the oil from splashing. The usual form of wooden dust guard is used at the back of the box, while the lid and box at the front have plane surfaces where they come in contact.

Uniform Car Sills.

The M. C. B. Committee of Uniformity of Sections for Car Sills sends out the following circular: "To assist the committee to reach useful results, members are requested to fill in on attached sheet the infor-

mation called for, giving the sizes of sections of longitudinal sills now used by them in their box, stock, flat and long gondola cars which are considered satisfactory. This information is only wanted for cars of 50,000 pounds capacity and over.

"Return sheet before Jan. 1, 1899, to R. P. C. Sanderson, Chairman, care of Norfolk & Western Ry., Roanoke, Va."

Bolts and Nuts.

The "M. C. B. Committee on Bolt Heads and Nuts" sends out the following circular:

Do you make the square-headed bolts used on your line?
If you make them, what standard do you follow as regards size and thickness of head?
If you make them according to M. C. B. or Sellers' standard (see pages 378, 379, 1898 report), do you find any difficulty in procuring a perfect head at one operation of the bolt-header?
When purchasing square-headed bolts do you specify any standard for head?
Have you ever found any objections on the part of manufacturers to furnishing bolts with Sellers' standard head? If so, please state their objections.
Do you find from any evidence from service that the heads are not large or thick enough?
Please give thickness and size of square heads from 1/4 inch to 2 inches diameter.
Do you make or purchase square nuts used on your line?
What standard do you follow in the manufacture of square nuts?
Do you specify any standard? If so, what one, when purchasing square nuts?
Do you find any difficulty in obtaining square nuts according to Sellers' standard?
Please give the thickness and size of square nuts from 1/4 inch to 2 inches which you make or use.
Send reply to B. Haskell, Chairman, care of C. & W. M. Ry., Grand Rapids, Mich.

Green Lights for All-Clear.

At the last meeting of the American Railway Association an officer of the New York, New Haven & Hartford stated that, in consequence of the accident at Whittenton Junction, a few months ago, in which the lantern on a gate was mistaken for a white semaphore light, the road would change its semaphore lamps so that the color indication for all-clear at night shall be green. We understand that active preparations have been begun to carry out this change.

Nicaragua Canal.

Representative Hepburn, of Iowa, Chairman of the Committee on Interstate and Foreign Commerce, introduced in the House Dec. 13 a bill authorizing the President to buy from Nicaragua and Costa Rica sufficient land through which to build the Nicaraguan Canal. The bill contemplates ownership by the Government and the erection of fortifications. One hundred and forty million dollars is to be appropriated. As we go to press the Senate debate, led by the windiest men in that house, is in progress.

The Standard Railroad Signal Company.

This company, the controlling interest in which was recently purchased by parties connected with the Trojan Coupler Company, is now moving its machinery and materials from Arlington, N. J., to its new shops at Troy, N. Y. The shops at Troy will also have new machinery, materially increasing the facilities of the company for promptly filling orders. The business of the company is now larger than ever before. Mr. Henry Johnson, Vice-President and Treasurer, who was one of the originators of this concern, and who has been the manager of the shops at Arlington, will resign his position and establish an office in New York City as consulting signal engineer.

THE SCRAP HEAP.

Notes.

Passenger conductors on the Texas & Pacific have had their pay increased from \$100 a month to \$125.

The Atchison, Topeka & Santa Fe has let to Mr. G. C. Mackenzie, of Chicago, the advertising privileges, except for railroad advertising, in the waiting rooms of all its stations.

The State Railroad Commissioners of New York have ordered the abolition of highway grade crossings in Glennville, St. Johnsville, Andover, Guilford, Forestport, West Seneca, Randolph and Elmira.

The engine house and carpenter shop of the New York, New Haven & Hartford at Hyannis, Mass., were destroyed by fire on Dec. 11, together with four locomotives.

One end of the 160-ton overhead bridge which spans the Boston & Albany and the New York, New Haven & Hartford tracks at Dartmouth street, Boston, fell two feet on Sunday evening last just after a train had passed by. There were about 20 men working beneath the bridge, of whom three were seriously injured. The Boston Bridge Co. had been preparing to move the bridge a distance of 30 ft., and the Columbus avenue end had been jacked up 24 in.

At Greenville, Mo., the President of the Williams-ville, Greenville & St. Louis Railway has been arrested on an indictment charging him with permitting his employees to run trains on Sunday and to carry on other work on that day.

There are about 2,000 miles of government telegraph lines in Cuba and the Signal Corps of the United States Army is preparing to take charge of and operate the lines. Signal service men are now on duty at Havana, Santiago, Pinar del Rio and other cities. The United States military camps in the island will be connected by telegraph or telephone wires.

Newspapers of Scotland report great activity in freight-car building. Two important roads have just ordered a thousand wagons each. The companies are actively building in their own shops, as well as giving orders to private firms. According to Herapath's Journal, shippers of iron ore, coal and other coarse freight have suffered from lack of wagons, and the short supply has now been so long continued that "private traders are again ordering rolling stock of their own."

In Omaha, Neb., there is an "anti-car-crowding society." The society made its first "demonstration" one evening last week when a street car conductor was sternly told that, if he admitted another passenger, the members of the society then standing in the car would make it hot for him. In New York City there has been formed a League of Passengers, for the purpose of combining to help one another whenever it is necessary to proceed, in the courts, or otherwise, against street railroads for not affording reasonable accommodations to passengers. The League has an office at No. 1 Union square and has adopted a constitution and a button. The button, we are informed, is round; and it is inscribed "L. of P." An appeal has been issued to the public to join the League, and the membership fee is 50 cents.

The Union Pacific is to double the capacity of one of its telegraph wires on the Wyoming Division by putting in the phonoplex.

The Nashville, Chattanooga & St. Louis will increase the wages of certain employees on the first of January 5 per cent., which, it is said, will restore the rates to an equality with those in force three years ago.

Snow fell to the depth of three or four feet in the region of Buffalo, N. Y., last week, and the railroads were blocked in some places by drifts 15 ft. to 20 ft. deep. The snow was heavy along the shore of Lake Ontario as far east as Watertown, but on the New York Central, east of Rochester, it was of only moderate depth. About the same time there was very cold weather in the western part of Texas and trains were delayed by snow.

The Post Office Department has terminated its contract for mail cars with the Nassau Street Railway Company, Brooklyn, N. Y., and will hereafter have the mails carried over the lines of the Brooklyn Heights Company. This company is building five new trolley cars to be used exclusively as postal cars.

Gov. Leedy of Kansas proposes to call an extra session of the Legislature to convene next week, provided the Populist members will agree in writing to support any measure that may be adopted by their caucus. The Governor's party was defeated at the November election, and the proposition to hold an extra session before the new Legislature comes in is made with a view to passing radical laws, reducing railroad and telegraph rates, while the present power lasts. The Populists also propose to establish state stock yards, and a state fire insurance department. The member who last year introduced a bill to incorporate the Ten Commandments into the laws of the state says he shall repeat his motion this year.

The War Department is arranging to send about 4,500 troops from New York to Manila, by way of the Suez Canal. It is said that three ships will be employed, carrying 1,500 men each. The canal tolls will be about \$25,000 on each ship, but it is estimated that to transport these troops by railroad from New York to San Francisco would cost over \$150,000, so that the Suez route is cheaper, notwithstanding the high cost of getting through the canal. It is said that ships could go from New York around Cape Horn in only 20 days more time than is required for the trip by way of the Suez Canal, but the service of the transports is valued at \$1,000 a day each. The loss due to this additional time would, therefore, be at least \$60,000, and the cost of coal on that route would be much greater than on the other.

The Engineers' Club—A Correction.

In the article on Commodore Melville, published last week, the statement was made that Commodore Loring is president of the Engineers' Club in New York. He is a past-president, but, as most of the civilized world well knows, Mr. John Thomson is now the President.

Chicago Street Railroads.

The ordinances before the Chicago Board of Aldermen extending the franchises of a number of city street railroads to the full term of 50 years, which have been the subject of much discussion and great excitement in that city for the last week or two, were finally rejected by the Aldermen on Dec. 12 by a vote of 38 to 25. Many mass meetings were held and there was developed a strong sentiment against granting to the street railroads any rights for terms as long as 50 years.

The extensions asked for were for the North Chicago, the West Chicago, the Chicago City, the Chicago General, the Chicago General Electric and the Chicago Electric Transit Co. The proposed ordinances provide for 50-year extension of all ordinances controlled by these corporations and passed prior to July 1, 1897; also that 5-cent fares be continued for the first 20 years; and for a graded compensation to the city ranging from one-half of one per cent. to three per cent. of the total annual gross receipts. Ordinances for 50 years were also presented for a number of smaller roads, including the Calumet Electric, the Illinois Traction Co. and the Northern Elec-

tric Co., some of which provide for larger percentages of compensation. While the question was pending, an argument prepared by an attorney for the roads and published in pamphlet form was issued by the companies and distributed in their cars and on the streets, presenting their side of the question.

Compressed Air Developments.

The rumors regarding the sale of the Rhode Island Locomotive Works to a syndicate have been confirmed from an authoritative source, and the transaction will be consummated in a short time. The syndicate buying this property is headed by Joseph Leiter of Chicago. The syndicate has also bought the entire foreign rights of the Hoadley-Knight compressed air patents, which were recently bought by the American Air Power Co. of New York for North and South America, and which system is now being installed by that company on the surface lines of the Metropolitan Street Railway Company of this city. It is stated that Mr. Leiter and his syndicate have made strong European alliances, and it is also stated that this concern is to be international in its character in more than one particular line.

The new syndicate is to have a capital of \$7,000,000, and will immediately remodel the entire works of the Rhode Island Works, and purchase other large works, all of which will possibly be situated at Providence. It is understood that the Orient will be a field well patronized by the new syndicate, inasmuch as the connections of the Leiters in that part of the globe will be of benefit.

The Paris Exposition.

Mr. Willard A. Smith, of Chicago, who was Chief of the Department of Transportation at the Columbian Exposition in 1893, will hold a similar position under the United States Government in connection with the Paris Exposition of 1900. Commissioner Peck has appointed Mr. Smith Director of the Department of Transportation and Civil Engineering, and he will at once proceed to organize the American exhibits for these departments.

The New York Gas and Electric Light, Heat & Power Co.

A few weeks ago there was incorporated the New York Gas and Electric Light, Heat & Power Co., with a capital of \$25,000,000. This company was organized evidently to secure control of lighting franchises in New York City. The newly incorporated company recently purchased the Mount Morris Electric Light Co., and also secured control of the Empire Subway Co., both of which control interests principally in the Borough of Manhattan. The men who own and control the new electric company also have an interest in or direct the affairs of the Metropolitan Street Railway Co. They are Messrs. William C. Whitney, Thomas Dolan, W. S. Elkins, P. A. B. Widener, John F. Ryan, Anthony N. Brady and Roswell P. Flower. Just what are the plans of the new company can only be surmised, but it would not be surprising to learn of plans for the general distribution of power at a reasonable rate in the upper part of the city.

The Chief Engineer of the Brooklyn Bridge.

Mr. Leverich, Mechanical Engineer of the New York and Brooklyn Bridge, writes to the New York Sun in reply to a correspondent who has criticized Mr. Martin, the Chief Engineer and Superintendent. We gladly endorse Mr. Leverich's letter, quoted in part below. Fidelity and integrity like Mr. Martin's are safe from attack.

"Mr. Curtis complains that Mr. Martin's judgment seems uniformly to prevail in questions regarding bridge management. Will he kindly state why not? Can he impeach Mr. Martin's integrity, exhibit his professional incapacity, and show his general incompetence? Who so well as Mr. Martin, with an extended experience unparalleled elsewhere in the control and management of the structure to which no other in situation, usage and importance can compare, is likely to be so capable? And is it not something that he has so long and so acceptably, in a peculiarly delicate and responsible position, done his duty under diverse and sometimes unsympathetic managers without pertinent criticism; earnest and diligent at all times, serving the public, whose servant he only is? It is well for one to know surely what he knows and to mistrust doubting criticisms until accumulated knowledge has established their truth."

The Home Life Fire.

Representatives of a number of makers of railroad supplies had offices in the Home Life Building, 256 Broadway, New York, which was partially destroyed in the recent large fire. We give below the names of all, as nearly as we can determine, together with the new addresses: Stephen S. Barnett, representing the Eureka Nut Lock Co. and the Verona Tool Works, 253 Broadway; L. J. Buckley, representing the Allison Mfg. Co., Cleveland Frog & Crossing Co., Damascus Bronze Co., Detroit Graphite Mfg. Co., Detroit Steel and Spring Co., Howe, Brown & Co., Ltd., Lobdell Car Wheel Co. and the Oliver Iron and Steel Co., 253 Broadway; Jones & Laughlin, Ltd., 220 Broadway; Sterlingworth Railway Supply Co., 253 Broadway. The offices of the American Machinist and Locomotive Engineering were also in this building and were destroyed. Mr. Sinclair requests us to state that the mailing list of Locomotive Engineering was destroyed, and he is having much difficulty in getting the names of the subscribers.

South Side Elevated Report.

The November report of the South Side Elevated, of Chicago, shows that the daily average number of passengers carried was 59,256. This is an increase of 1,058 per day over October, 1898, and of 4,961 a day over November, 1897. This statement gives the first fair comparison with a corresponding month last year in which the facilities furnished and the operating conditions were practically the same, as November, 1897, was the first entire month that the road used the elevated loop.

The Gornegrat Railroad.

This road, the highest in Europe, was opened in August last. This is not only a mountain railroad, but also a glacier railroad, as it passes through most magnificent snow and ice fields. Within an hour and 30 minutes the tourist is taken to a height of 3,020 meters (nearly two miles), but as softly and gently as in a hotel elevator. There is neither shock nor jar nor jolting. The road is worked by electricity. The railroad starts from Visp-Zermatt and crosses the valley obliquely. The passengers see successively Mutz, the Gabelhorn and the Rorthorn,

with their eternal snows and glaciers. The second iron bridge is over the foaming Kudeibach, which to the left falls over a precipice. At this place a great reservoir has been built from which the water is carried in iron pipes to the valley below to furnish electric power. About 150 ft. above the surface of the water the road passes over a bridge and into the first tunnel, after leaving which the Durand Glacier comes into view. After passing through a second, a third and a fourth tunnel, the Riffel-Alp station is reached. The grade, generally 16 per cent., here reaches 20 per cent. Before reaching the last station, Gornegrat, the line passes through a fifth tunnel. From the terminus to the summit itself a good pedestrian has before him only a quarter of an hour's walk along a good road. The panorama which the beholder has here spread before him is not surpassed by that from the top of the Jungfrau, and the air at a height of 3,020 meters is easier to endure than at 4,100 meters, where it is generally unwise to stay any length of time.

The Soudan Railroad.

Lord Kitchener has lately been busying himself in connection with the extension of the Soudan Railroad to Khartoum. The construction of the additional 180 miles has been decided upon, and the orders for the bridges are being placed with several British firms, with the object of securing speed in construction. Most of these bridges will be lattice girders. The principal one will be that spanning the Atbara, near its confluence with the Nile, and this will be over 1,200 ft. in length. There will be, in addition, between 50 and 60 smaller bridges, some of them spanning channels which are merely dry gullies at certain seasons of the year, but which have to be reckoned with in view of the periodical flooding of all the water-courses.—Transport.

The Standard Code in Colorado.

For the first time in many years a car famine on the South Park Railroad is reported. When a car famine strikes that line it may be generally conceded that business is picking up, and this recalls a story that has been in circulation for several years among the men on that line. A brakeman applied to Superintendent Choate for a position, and in the catechizing that followed, Mr. Choate, after sounding him man at some length, asked what he would think if he saw a freight train going up the South Park line carrying a red flag. "I would think that business was picking up like —," promptly replied the brakeman; and he got his job.—Denver Times.

Stored Steam and Electric Cars on a Steam Road.

A recent issue of L'Eclairage Electrique gives an account of the motor cars used by the Compagnie du Nord on their road for postal service or where the traffic is light. A Serpollet stored steam motor car has been used to some extent between Beauvais and Creil. In running from Paris to the former place with trailers the total weight of the train is about 36 tons, and 9½ liters of water are consumed. The mean speed, excluding stops, was 46.2 kilometers (29 miles) an hour. The same company also uses a storage battery car weighing 14½ tons carrying accumulators weighing 3.8 tons for light traffic.

Railroad Trespassers in France.

The French Minister of Public Works has issued a circular order to Préfets throughout the Republic calling attention to the fact that acts of malicious trespass on railroads are becoming more frequent. While these are often committed by children, who do not know the consequences, they are sometimes committed by people with malicious purpose, and some very serious accidents have resulted. The Minister calls for greater vigilance on the part of the officers of the railroad companies and of the local authorities. He asks that orders be issued to Mayors of cities, to the police and to the gendarmes, to aid the railroad officers in carefully guarding against such acts. The most of those who commit these acts are never discovered.

A Railroad from the Black Sea to the Adriatic.

The Serbian Ambassador at Constantinople has addressed a note to the Porte referring to the project for uniting the Black Sea with the Adriatic by the shortest railroad route. Roumania and Servia have reached an agreement for the building of that part of the line respectively belonging to them. Roumania has already located that portion which comes within the limits of her territory, and Konstanza on the Black Sea is to be united with Turn-Severin on the border. Servia would be ready to build its portion of the connecting line from Kadovo (Turn-Severin) over Nisch to Kurschumlje on the border between Servia and Turkey. There will thus remain only the part in Turkey to be done. This is from Kurschumlje over the great plateau of Vilajes, from Kosowo, then through the valley of the Drina to Scutari and in Albania San Giovanni di Medua. In Servian circles it is feared that it will be a long time before the Porte will take the necessary steps to carry out this project. Should the projected railroad really be built, it would furnish the shortest route between the Adriatic Sea and the Servian border, and Nisch would be the junction point of three important railroads, viz.: that from Sofia and Constantinople, that from Salonica and finally the projected line to San Giovanni di Medua. Also Roumania could make use of this new route for its export business.

Oil on the Highway.

Railroad Gazette readers are by this time fairly familiar with the recent use of crude petroleum as a means of suppressing dust on the roadbed of a railroad. Now comes the proposition to use it on highways. At a recent convention in St. Louis a civil engineer of Keokuk, Ia., reported that he had been using oil on muddy highways, by which he "succeeded in keeping them in such good condition that they have attracted wide attention. He has found that a barrel of crude oil is sufficient for a strip of road 100 ft. long and 12 ft. wide." It is said that the oil makes a waterproof covering and so helps to prevent muddy roads. There might be something in this for a well-drained highway, particularly if it is macadamized.

Paving for Lebanon, Pa.

This city is beginning to agitate the question of having paved streets. With the exception of about half a block of asphalt block paving, this city has had nothing else but limestone and cinder macadam since the beginning. A project is now before the City Council looking toward having North Eighth street substantially paved. George W. Hayes is City Engineer.

Development of Nile Power.

Professor George Forbes has, on the request of the Egyptian Minister of Public Works, examined the Nile from Cairo to the Fourth Cataract, and says that power could be generated at the First Cataract, Assouan, to supply electricity for pumping for the irrigation. It could also be utilized for electric light, railroad and tramways. At the Second Cataract, just above Wady-Halfa, the chief value of the almost unlimited power to be developed would be for working the two railroads—one following the course of the Nile towards Dongola for 200 miles; the other going across the desert to Abu Hamid, and thence, when completed, to Khartoum. But, in order to work this last railroad with the best economy, it would be necessary to make use of the Fifth and Sixth Cataracts in addition, which Prof. Forbes has not examined. Near the Third Cataract at Kaibar a dam could easily be built, not only for impounding water, but also for assisting the irrigation at low water in Egypt proper, and for generating electric power. This would be applied partly to working the first railroad spoken of above, and partly to pumping operations in the Dongola province. This province appeared to the Professor to be capable of being made one of the most fertile regions of the world, but hitherto no irrigation had been attempted there except on a small scale at the river banks.

LOCOMOTIVE BUILDING.

The Fitchburg is arranging to buy two engines from the Manchester Locomotive Works.

The Baldwin Locomotive Works are building one eight-wheel simple engine for the Queen Anne.

The Manistee & Northwestern has ordered one mogul engine from the Baldwin Locomotive Works.

It is reported that the Prince Edward Island has ordered two engines from the Canadian Locomotive & Engine Co.

The Chicago, Burlington & Quincy is building, at its own shops, a number of mogul engines, four of which will be compound.

It is reported that the Chicago, Milwaukee & St. Paul will build six more switching engines at its West Milwaukee shops.

The Mexican National is having three compound consolidation engines, of 3 ft. gage, built by the Baldwin Locomotive Works.

The Philadelphia & Reading Coal & Iron Co. has ordered two eight-wheel compounds from the Baldwin Locomotive Works.

The Terre Haute & Indianapolis (Vandalia Line) has ordered four passenger locomotives from the Schenectady Locomotive Works.

We are informed by Mr. William Renshaw, Superintendent of Machinery, that the Illinois Central does not contemplate buying any additional locomotives or cars at present.

We are officially informed that while the Michigan Central is considering new locomotives, as noted last week, no decision has as yet been reached either as to specifications or the letting of the contract.

The 26 engines to be built by the Cooke Locomotive & Machine Works for the Southern Pacific, and referred to last week, will be simple moguls, with 20 x 26 in. cylinders, and will weigh 144,200 lbs., with 124,000 lbs. on the driving wheels; the boilers will be of the wagon top type and 63 in. in diameter; working steam pressure, 190 lbs.; fireboxes, 108½ in. long and 40½ in. wide; tender capacity, 4,500 gals. of water and 10 tons of coal. The locomotives will be equipped with Westinghouse brakes, hammered iron axles, Christie brake shoes, California couplers, Nathan lubricators, Kilbourn & Young piston and valve rod packings, Leach sanding devices, Nathan lubricators, French springs and Midval and Latrobe tires.

In our last issue we referred to an order of 45 engines placed by the Lake Shore & Michigan Southern with the Brooks Locomotive Works. The 15 six-wheel switching engines will have 19 x 26 in. cylinders; 52 in. driving wheels; straight top type boilers; working steam pressure, 170 lbs.; fireboxes, 80 in. long and 34½ in. wide; weight, 128,000 lbs. The tenders will have a capacity of 3,500 gals. of water and about five tons of coal. The 15 10-wheel engines will have 19½ x 30 in. cylinders; 62-in. driving wheels; wagon top type boilers; working steam pressure, 180 lbs.; fireboxes, 114 in. long and 42 in. wide; weight 150,000 lbs., with 118,000 lbs. on the driving wheels. The tenders will have a capacity of 5,000 gals. of water and about 10 tons of coal. The remaining 15 engines will be of the consolidation type, with 20½ x 28 in. cylinders and 56 in. driving wheels, and will weigh 150,000 lbs., with 133,000 lbs. on the driving wheels. In other respects, the dimensions given for the 10-wheel engines will apply to the consolidations. All these engines will have Westinghouse brakes, National hollow brake beams, Gould couplers, Monitor injectors, U. S. metallic piston and valve rod packings, 3½ in. Ashton muffled safety valves, Leach sanding devices and Nathan No. 9 lubricators. The switching engines will have Latrobe and the other engines Midvale tires. The engines will also have No. 9 W. G. tubes, steel tender frames, brick arch on tubes and steel driving boxes. The 10-wheel locomotives will have water scoops.

CAR BUILDING.

The New York & Ottawa is in the market for 500 freight cars.

The Central Railroad of New Jersey is about to let a contract for 2,000 freight cars.

The Duluth, South Shore & Atlantic has ordered 10 freight cars from the Wells & French Co.

Pullman's Palace Car Co. is building one passenger car for the Gila Valley, Globe & Northern.

The Monongahela River has ordered 500 freight cars from the South Baltimore Car Works.

The Pennsylvania Railroad has placed an order with Pullman's Palace Car Co. for 20 coaches.

The Illinois Car & Equipment Co. is building 25 freight cars for the Western Car & Equipment Co.

The Chicago Great Western has asked car builders for propositions and date of delivery on 700 box cars.

The Bangor & Aroostook will order eight or 10 passenger cars, probably from the Jackson & Sharp Co.

The Ohio Falls Car Mfg. Co. is building 12 freight cars for the Cincinnati, New Orleans & Texas Pacific.

It is reported that the Great Northern is considering buying some new freight cars, but we have no official information.

It is reported that the St. Paul & Duluth is considering buying some box cars, probably 300. We have no official information.

The Erie has placed an order with the Michigan-Penninsular Car Co. for 2,000 cars. These are in addition to the 1,000 referred to in our issue of Nov. 4.

We have received information that the St. Louis, Peoria & Northern will later buy 3,000 cars instead of 2,500, as noted last week, and that it will shortly order about 400 gondolas.

The Atlantic, Valdosta & Western is in the market for from 100 to 150 box and flat cars, the latter to be of 80,000 lbs. capacity. The road will also order four or five passenger cars for a complete train.

The Pennsylvania Lines West of Pittsburgh have ordered 300 cars from the Erie Car Works and 300 from the Wells & French Co. The Schoen Pressed Steel Co. will also build 500 steel cars for the same company.

We are reliably informed that the Northern Pacific has asked car builders what deliveries can be made on 1,000 box cars of 80,000 lbs. capacity, to be built according to the specifications used for the last order for cars of the same class. It is also reported that the road will buy some postal cars, probably 10.

The 600 stock cars ordered by the Chicago, Burlington & Quincy from the Illinois Car & Equipment Co. and noted in our issue of last week, are for January and March delivery. They will be 36 ft. long and of 50,000 lbs. capacity, and have Westinghouse air brakes, Chicago couplers, McCord journal boxes and steel axles.

The Ramapo Iron Works have received an order to build 100 eight-wheel flat cars, 7 ft. wide and 22 ft. long, with channel and I-beam steel trucks and 75 four-wheel cars, all for use on plantations in Eastern Cuba. The same company is also building 12 steel box cars for the government railroads of San Domingo. They will be equipped with Gould couplers and buffers and steel tired wheels.

The Cleveland (O.) & Chagrin Falls Electric contemplates buying a few more cars. (See Electric Railroad Construction column.)

The Delaware County & Philadelphia Electric (Clifton Heights, Pa.), now building, will require 10 open and eight closed motor cars. (See Electric Railroad Construction column.)

BRIDGE BUILDING

ALBANY, N. Y.—The Hudson River Bridge Co. intends to replace the superstructure of the present bridge over the Hudson River, between Maiden Lane and East Albany. The new bridge is to be in the same location as the present one and some of the old piers will be used. It will be heavier than the present one, which was built in 1872. The estimated cost of the work is \$500,000. Plans are being prepared in the office of W. J. Wilgus, Engineer Maintenance of Way, New York Central & Hudson River RR., Grand Central Station, New York. G. E. Ellis is Superintendent of the Hudson River Bridge Co.

ARUNDEL, QUE.—Tenders are wanted by Wm. Thomson, Secretary and Treasurer, for the building of the superstructure of the iron bridge over the Rouge River at Arundel.

BOSTON, MASS.—The Board of Street Commissioners are considering the advisability of extending Atlantic Ave. by a bridge over the Terminal Company's tracks, and over Fort Point channel to Dorchester Ave. The commissioners' estimate for building the bridge is \$400,000. Wm. Jackson, City Engineer.

BROOKHAVEN, MISS.—The bridge to be built over the Honochitto River in Lincoln Co., is wanted by Jan. 3, 1899. The length of span will be 225 ft. E. P. Alsbury & Son, Houston, Tex., prepared the plans for the bridge, which are now on file in the office of the Board of Supervisors, Brookhaven.

CHAMBERLAIN, S. D.—Senator Pettigrew, of South Dakota, Dec. 8 introduced a bill in the U. S. Senate to authorize the building of a bridge across the Missouri River at a point within five miles south or five miles north of Chamberlain. The bill provides for the Dakota Pacific Bridge Co. to build a combined railroad, wagon and foot passenger bridge across the river. The bridge is to be built at the option of the company as a drawbridge or with unbroken or continuous spans. If built as a drawbridge it shall be constructed as a pivot drawbridge, with one or more draws, as the Secretary of War may direct.

CHARLOTTETOWN, P. E. I.—Bids are asked until Dec. 21 for building a bridge at Alberry Plains, near Charlottetown. Richard Smith, Secretary Board of Public Works. (Aug. 26, p. 616.)

CHATHAM, ONT.—The Lake Erie & Detroit River Railway Company is said to have decided to build a swing bridge over the Thames River at this point.

CHICAGO, ILL.—Judge Payne, of the Appellate Court, Dec. 6 issued an injunction forbidding the Sanitary District Commissioners from completing the terms of the contract awarded to the Scherzer Roller Lift Bridge Co. for the building of the railroad bridge at Campbell Ave. (July 1, p. 483.)

CLEVELAND, O.—The City Council has authorized the Director of Public Works to advertise for bids for the building of the superstructure for the Center St. bridge. Work has already begun on the substructure. (Oct. 21, p. 766.)

DETROIT, MICH.—Senator McMillan, of Michigan, introduced in the United States Senate Dec. 6 a bill providing that the Detroit Bridge Co. be empowered to build a bridge across the Detroit River at or near Detroit, Mich. The plan, location and elevation of the bridge are to be decided on by three officers of the corps of engineers selected by the Secretary of War. The bridge is for the use of all connecting

railroads on either side of the river. The length of the main channel span will be about 1,200 ft. Work to be begun within three years and completed within six years. The construction shall not be begun, however, until the Dominion Government has authorized the building and maintenance of that part of the bridge which would be under the jurisdiction of the Dominion Government.

DULUTH, MINN.—Receivers were appointed for the Duluth & Superior Bridge Co., Dec. 6.

FRANKLIN, PA.—The viewers appointed to report on the bridge to be built over the Pine Run on the road from Oil City to Collingsburg, have reported favorably.

Viewers have recommended the building of a bridge over Pithole Creek, Allegheny Township.

GRAND RAPIDS, MICH.—The bridges to be built over the tracks of the Chicago & West Michigan Ry. at Myrtle and Amity Sts., are to be made of old material, which the company took from a trestle that had become too light for railroad traffic. No bids are wanted, as the company intends doing the work.

HUTCHINSON'S ISLAND, GA.—Representative Lester of Georgia, on Dec. 7 introduced in the House of Representatives a bill to authorize the building of a bridge across the Savannah River from the mainland of Chatham County to Hutchinson's Island, in the same county. The bill gives the Georgia & Alabama Ry. the right to build the bridge. It is to be draw span or otherwise, as may be decided.

LANSING, MICH.—The Michigan Central Bridge Co., incorporated about three years ago to build a bridge across the Detroit River, has amended its articles of incorporation, and will hereafter be known as the Detroit River Bridge Co. The capital stock remains unchanged.

LAYTON, PA.—The Washington Run RR. will build bridges. (See Railroad Construction column.)

MILWAUKEE, WIS.—The City Council has adopted City Engineer G. H. Benzenberg's plans for the viaduct over Kinnickinnic Ave. The total length is 1,750 ft., and the grade of the approaches 3.9%. The estimated cost is \$184,000.

MONTREAL, QUE.—The opening of the new Victoria Jubilee bridge across the St. Lawrence River will take place May 24, 1899. It is expected that the bridge will be finished and ready for traffic by the end of January. The gold rivet driven into the main span of the old bridge by the Prince of Wales on the occasion of its opening in 1860, is to be sent to Ottawa to be placed in the Library of the Parliament Building. It is reported that the Prince of Wales has been requested to attend the opening ceremonies next May.

At a recent public meeting a committee was appointed to wait upon the road committee of the City Council to urge the building of the overhead bridge to connect Shearer and Congregation Sts.

NASHVILLE, TENN.—The Tennessee Central will build bridges. (See Railroad Construction column.)

NEWPORT, R. I.—The N. Y., N. H. & H. RR. has been ordered by the War Department that by May 1, 1899, a new draw, 100 ft. wide, must be in working order over the Sakonet River at Tiverton.

NORRISTOWN, PA.—The bridge crossing Little Branch Creek, which was built last summer, has been washed away, and a new structure will have to be built. Edward M. Ritchie, County Surveyor, Norristown.

PERTH, ONT.—The Lanark County Council have decided to build the Waba Brook bridge.

QUEBEC, QUE.—The Quebec Bridge Co. has been asked to extend the time for the submission of tenders for the proposed bridge over the St. Lawrence River at Quebec, from Jan. 2 to Feb. 2.

RACINE, WIS.—The Milwaukee, Racine & Kenosha Electric Ry. is to build one swing bridge on the proposed extension of its lines. (See Electric Railroad Construction column.)

ST. THOMAS, ONT.—James E. Bell, City Engineer, has recommended to the Elgin County Council that the Kains, Port Bruce and the Talbot Creek bridges be replaced by steel structures.

SEIVERVILLE, N. Y.—The Kinderhook & Hudson RR. will build bridges. (See Railroad Construction column.)

SPOKANE, WASH.—The Washington St. bridge has been condemned by the Board of Public Works, and a new structure will probably be built. Henry Treede, chairman of the County Commissioners, can give information.

TACOMA, WASH.—The City Council has instructed City Engineer Taylor to prepare plans for a bridge over the Puyallup River.

TORONTO, ONT.—The Metropolitan St. Ry. Co. will shortly build a steel bridge over the Grand Trunk Ry. tracks at Aurora.

VICTORIA, B. C.—Plans and an estimate of cost have been prepared by City Engineer E. A. Wilmot for the building of the proposed bridge across the St. James Flats. He estimates that \$110,000 will be the cost. The question will be considered at the next meeting of the City Council. (Dec. 9, p. 883.)

WATERTOWN, N. Y.—The Court St. bridge has been declared in a dangerous condition and a new bridge has been recommended.

MEETINGS AND ANNOUNCEMENTS.**Dividends.**

Chicago & Eastern Illinois.—Preferred, quarterly, 1½ per cent., common 1½ per cent., payable Jan. 2.
Chicago Great Western.—Semi-annual, preferred, \$2 per share, payable Jan. 31.
Chicago Junction & Union Stock Yards.—Preferred, quarterly, 1½ per cent. Common, semi-annual, 4 per cent., payable Jan. 3.
Delaware & Hudson Canal Co.—Quarterly, 1½ per cent., payable Dec. 15.
Keokuk & Western.—Annual, 1 per cent., payable Jan. 3.
Manhattan Elevated.—Quarterly, 1 per cent., payable Jan. 3.
Northern Central.—Semi-annual, 4 per cent., payable Jan. 16.
Old Colony.—Quarterly, 1½ per cent., payable Dec. 15.

Pacific Coast Co.—Common, 1 per cent., payable Dec. 15.

Rio Grande Western.—Preferred, quarterly, 1½ per cent., payable Feb. 1.

St. Louis & San Francisco.—Preferred, 2 per cent., payable Jan. 6.

Buffalo Ry.—Quarterly, 1 per cent., payable Dec. 15.

Detroit Engineering Society.

The regular monthly meeting will be held at the Hotel Ste. Claire, Friday, Dec. 16, at 8 p. m. Paper, "The Civil Engineer and National Public Works," by Geo. Y. Wisner, President Detroit Engineering Society.

American Society of Civil Engineers.

The event announced for the entertainment and instruction of the American Society of Civil Engineers on Wednesday evening of this week was an illustrated lecture by Mr. Hiram S. Maxim, Member of the Society, describing his experiments and inventions, both with aeroplanes and with automatic guns.

Western Railway Club.

At the next meeting of the Western Railway Club, to be held Tuesday afternoon, Dec. 20 at the Auditorium Hotel, Chicago, Mr. William Garstang, Superintendent of Motive Power of the Cleveland, Cincinnati, Chicago & St. Louis, will present a paper on locomotive fuel, giving the results of tests recently made at Purdue University for that road.

Western Society of Engineers.

The Entertainment Committee last week issued invitations to members and their guests, including ladies, to a reception at the Society's room, 1736 to 1741 Monadnock Block, Chicago, for Thursday evening, Dec. 15, at 8:15 o'clock. During the evening the guests were to be taken on a trip to the mountains and mountain railways of Switzerland, the excursion to be conducted by one of the committee.

Engineers' Club of St. Louis.

The annual meeting of the Engineers' Club was held on Dec. 7. The present membership of the Club is 204. The paper by Mr. A. H. Zeller, describing the celebration of the fiftieth anniversary of the French Society of Civil Engineers, was the feature of the evening. The following officers have been elected for the ensuing year: President, B. H. Colby; Vice-President, Prof. F. E. Knifer; Secretary, E. R. Fish; Treasurer, Thomas B. McMath; Librarian, E. J. Jolley; Directors, S. E. Freeman and J. H. Kinealy; Board of Managers of the Journal, J. B. Johnson and Richard McCulloch.

Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held at 8:15 p. m. December 5, President Estabrook in the chair and 10 members present. The Secretary was instructed to thank Superintendent I. F. Forbes, of the Great Northern, and accept an invitation to visit the shops at some future time. Mr. Oliver Crosby read a paper on "The Manufacture of U. S. 12-in. Mortar Carriages." The American Hoist & Derrick Co., of this city, have been turning out these carriages under his direction at the rate of two per month during the past year. He exhibited test pieces of gun iron, the strength of which must be twice that of ordinary cast-iron. After much experimenting in the mixture of various grades of iron he successfully melts, in a cupola furnace, the necessary 20 tons for one pouring and molds the same to pass the most rigid inspection.

American Institute of Mining Engineers.

The seventy-sixth (twenty-ninth annual) meeting of the Institute will be held in New York City, beginning Tuesday, February 21, 1899. Hotel headquarters will be at the Murray Hill Hotel, corner of Park avenue and Fortieth street. Sessions will be held, through the courtesy of the American Society of Mechanical Engineers, in its hall, No. 12 West Thirty-first street. Some of the largest mining and metallurgical operations in the United States are located in the immediate neighborhood of this city. It is expected that arrangements will be made by which a considerable number of these establishments can be visited. Suitable social entertainment will also be provided. A special topic of discussion at this meeting will be the paper on "The Evolution of Mine-Surveying Instruments," by Dunbar D. Scott, Ironwood, Mich. This important paper surveys the history of mine surveying, describing, illustrating and criticising the successive types of apparatus employed in this and other countries. It is now in press, and will be issued to members shortly.

Convention of Freight Commissioners.

The National Association of Freight Commissioners held its second annual meeting in Washington, D. C., on Monday of this week. Resolutions were adopted declaring that express companies should be made amenable to the Interstate Commerce law, and be required to file tariff and also contracts and agreements with railroad lines; indorsing the anti-scalping law; pledging the aid of the Association to the railroads to prevent legislation needlessly injurious to common carriers; favoring uniformity of freight classification, and consolidations of classifications whenever possible, and urging Congress to declare specifically that express companies shall pay the war revenue tax. A resolution was also adopted favoring a Government parcel post system, modeled on the British system. The following officers were unanimously elected for the ensuing year: N. B. Kelly, Philadelphia, President; John L. Moore, Detroit, Mich., Vice-President; W. P. Trickett, Kansas City, Mo., Secretary; F. W. Maxwell, St. Joseph, Mo., Treasurer, and an Executive Committee, as follows: A. J. Vanlandingham, Chairman, St. Louis; F. B. Thurber, New York; J. J. Telford, Louisville, Ky.; J. S. Davant, Memphis, Tenn.; J. J. Hyland, Chicago, Ill.

Engineers' Club of St. Louis.

The four hundred and eightieth meeting was called to order at 8:15 p. m., Dec. 7, with President Bryan in the chair. Thirty-four members and 19 visitors were present. Sixteen of these visitors were ladies.

This being the annual meeting, reports were called for from the officers and standing committees. The Committee on Nominations reported the following nominations for officers for 1899: For President, B. H. Colby; for Vice-President, F. E. Nipher; for Secretary, E. R. Fish; for Treasurer, Thos. B. McMath; For Librarian, E. J. Jolley; for Directors, S. E. Freeman and J. H. Kinealy. For members of the Board of Managers of the Journal of the Association of Engineering Societies, J. B. Johnson and Richard Mc-

Culloch. The following additional nominations were made: For Vice-President, M. L. Holman, Ed. Flad and J. B. Johnson; for Secretary, Henry Branch; for Treasurer, E. H. Connor; for Directors, A. H. Zeller and John A. Laird.

The President stated that in the absence of any objection, the Executive Committee would arrange for the annual supper, to be held at the next meeting, Dec. 21, 1898.

The paper of the evening, by Mr. A. H. Zeller, was then read. The author was a delegate from the Engineers' Club of St. Louis to the celebration of the fiftieth anniversary of the Civil Engineers of France, and the paper described the manner in which the event was celebrated. He gave an account of the excursions on which the visitors were taken, and described the works of engineering interest which were visited. After the reading of the paper, a number of lantern slides were exhibited, showing views of engineering works in Paris, Berlin and other European cities.

PERSONAL.

—Mr. Grinnell Burt has been elected President of the Lehigh & Hudson for his fortieth successive term.

—Col. L. N. Trammell has been re-appointed by Governor Candler, of Georgia, State Railroad Commissioner.

—Mr. George H. Parrish, for many years Superintendent of the Lehigh & Wilkesbarre Coal Co., died at Wilkesbarre Dec. 10, at the age of 79.

—Mr. A. A. Heard, Western Passenger Agent of the Lehigh Valley, was elected President of the Buffalo Transportation Club, at the annual meeting held in Buffalo, Dec. 10.

—Mr. W. H. Truesdale, Vice President and General Manager of the Chicago, Rock Island & Pacific, has been elected Chairman of the Southwestern Traffic Bureau, succeeding Mr. S. W. Fordyce, resigned.

—Mr. Jule M. Hartley, of Missoula, Mont., has been appointed a Commissioner by President McKinley to examine and classify lands in the land grant limits of the Northern Pacific, in the Missoula district.

—Mr. John L. Gardner, Chairman of the Board of Directors of the Chicago, Burlington & Quincy, died in Boston, Mass., Dec. 13, at the age of 63. Mr. Gardner was elected Chairman of the Board, succeeding the late John Malcolm Forbes, in October last. He had been a director of the road since 1885.

—Mr. Joseph Wescott Peters, Superintendent and General Ticket Agent of the Portland & Rochester, died at Portland, Me., Dec. 11. He had been connected with that line during his entire railroad service, a period of 28 years. In November he practically relinquished the duties of his office, owing to his failing health, and Mr. Herbert W. Davis, whose appointment as Assistant Superintendent was noticed at the time, was placed in charge. Mr. Peters was 63 years old.

—Mr. Samuel McElroy died at his home in Brooklyn last Friday at the age of 74 years. Mr. McElroy served as an engineer in the U. S. Navy in his early life. In 1859 he was appointed civil engineer in the Department of City Works of Brooklyn, and he had much to do with designing the water supply system of that city. For many years he had been in private practice as a consulting engineer, and he was well known as an engineer in many parts of the country. He was a member of the American Society of Mechanical Engineers, having been elected in 1881; also, of the Western Society of Engineers and of various other scientific bodies.

—Major General William Ludlow, U. S. V., Corps of Engineers, U. S. A., M. Am. Soc. C. E., has been appointed by the President as Military and Civil Governor of Havana, having power over the city itself; General Lee's command covers the entire Havana Province. It seems to us that the selection of General Ludlow for this post is most admirable. He is not only a distinguished engineer officer, but has had considerable experience in municipal work, having been for some time at the head of the Water Department of the city of Philadelphia and having been also Engineer Commissioner of the District of Columbia. He has not only professional qualifications, but is a man of great resolution, courage and energy.

—Mr. C. L. Mayne, who has announced his intention of resigning the position of General Superintendent of the Fitchburg RR., has been connected with that road since 1892, when he was appointed Division Superintendent. He was born in Bellevue, O., in 1857. He entered railroad service as a messenger boy in a telegraph office in his native town. His first position of prominence was that of Assistant Train Dispatcher on the Lake Shore & Michigan Southern. In April, 1883, he became Train Dispatcher of the Chicago & Atlantic, and four years afterward he was appointed Trainmaster, which position he held for two years. His next promotion was that of Acting Superintendent, and in November, 1890, he was made Superintendent. He had been in that position for two years when he became connected with the Fitchburg.

—A reception and dinner were given to Mr. Chas. M. Hays, General Manager of the Grand Trunk, on a recent visit to Portland, Me. This was done by the Portland Board of Trade, of which Mr. F. E. Boothby, the General Passenger and Ticket Agent of the Maine Central, is the President. In the course of Mr. Hays' address he said that the business of the Grand Trunk had increased in Portland over 100 per cent. in 1896, and there was a further increase of 60 per cent. last year over the previous year. During the present season he expected much larger increases. In concluding his remarks he said: "One great complaint has been that we could only do business here a few months of the year. I will not venture to say it, but stranger things have happened, and you need not be surprised if in the near future, we find it possible to do business here the year round."

—Sir William Anderson, an eminent English engineer, died recently in England. He was born in 1835, studied at King's College, in London, and became a pupil of Sir William Fairbairn. He practiced for nine years in Dublin, building bridges and other structures, and in 1864 joined the firm of Easton & Amos in building the Erith Iron Works. In 1889 he was appointed Director General of the Royal Ordnance Factories, comprising the laboratory, gun factory and

carriage departments at Woolwich, the gunpowder factory at Waltham Abbey and the small arms factories at Enfield and Birmingham. In this position he succeeded Sir Henry Gordon, the brother of "Chinese" Gordon. Sir William Anderson was a member of the Council of the Institute of Civil Engineers, Vice President of the Institute of Mechanical Engineers and of the Society of Arts. He was knighted in 1897.

—Mr. Henry Johnson, Vice-President of the Standard Railroad Signal Co., will sever his connection with that company on Jan. 1 and open an office in New York as consulting engineer in railroad signaling. Mr. Johnson has had an experience of more than 40 years in signaling, 23 in England and 12 in this country. In England he was with Stevens & Sons for 15 years, advancing to the position of General Agent. In 1873 he went to Saxby & Farmer, taking charge of their business in the northern counties of England, Scotland and Ireland. In 1882 he became Superintendent of the Signal Department of the Lancashire & Yorkshire Railroad, but soon came to this country. Here he was first with the Union Switch & Signal Company, then with the Johnson Railroad Signal Company; and after the control of that company was sold he joined Mr. Cade in the establishment of the Standard Company. The profession of consulting engineer in signaling is practically a new one in this country, but there would seem to be an opportunity for useful work in it.

—Mr. Robert Sinclair died at Florence on Oct. 20. Born in 1817 in London, he was educated at Charterhouse, where he had for his house monitor W. M. Thackeray. He became a pupil of Mr. Robert Stephenson, and entered the service of Messrs. Locke & Errington. While under these gentlemen he assisted in building the railroads between Liverpool and Manchester and between Paris and Rouen. From France, in 1846, he went to Greenock to superintend the construction of the railroad between that town and Glasgow, and of this he became the first Manager. He then joined the Caledonian Railway as Locomotive Superintendent, a post which he held until 1851, when, at the early age of 34, he became General Manager of that important line. In 1856 he left Scotland to become Chief Engineer and Locomotive Superintendent of the Great Eastern, from which he retired, owing to bad health, in 1868. He was the first to put "spectacles" and cabs on the engines, and one of his most valued possessions was a testimonial signed by a large number of engine drivers and firemen thanking him for his care for their welfare.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—Ethelbert E. Jenks has been appointed foreman of the shops at Pueblo, Col., succeeding H. E. Clucas. (Dec. 2, p. 867.)

Baltimore & Ohio.—M. Hamilton has been appointed Traveling Freight Agent for the main lines and branches from Bloomington, Md., to Parkersburg, W. Va., with headquarters at Parkersburg, W. Va.

The duties of the position of General Manager, heretofore held by Wm. Greene, resigned, will be assumed for the present by Oscar G. Murray, Receiver. All communications heretofore sent to the General Manager should be addressed to Mr. Murray. J. T. Wilson, heretofore draughtsman in the offices of the Pittsburg, Fort Wayne & Chicago, has been appointed resident Engineer of Construction, with headquarters at Pittsburg, Pa.

Baltimore & Ohio Southwestern.—W. W. Peabody, Jr., Assistant General Freight Agent, Cincinnati, O., has resigned.

D. Horace Johnson has resigned as Chief Electrician.

Bath & Hammondsport.—At the annual meeting held in Hammondsport, N. Y., J. F. Parkhurst was elected a Director, succeeding H. S. Stebbins.

Canadian Pacific.—H. M. McLeod has been appointed Superintendent of the Crow's Nest branch, with headquarters at McLeod, Alberta. G. Erickson has been appointed Trainmaster of the same branch, with headquarters at the same point.

Chicago & Western Indiana.—Edward H. Lee has been appointed Engineer and General Roadmaster for this company and the Belt Railway Company of Chicago, succeeding F. C. Doran, deceased. His headquarters are at Chicago, Ill.

Chicago, Rock Island & Pacific.—E. Drake has been appointed District Passenger Agent, with headquarters at Wichita, Kan. He succeeds A. E. Cooper, promoted. (Nov. 25, p. 852.)

Cincinnati, New Orleans & Texas Pacific.—H. J. Van Dermark, heretofore agent in Georgetown, Ky., has been appointed Northeastern Passenger Agent, succeeding J. M. Chesbrough, resigned. His headquarters are at Detroit, Mich.

Cincinnati, Portsmouth & Virginia.—T. D. Rhodes, who has been Purchasing Agent, General Passenger Agent and Assistant to President Samuel Hunt, will assume Mr. Hunt's duties during his term as Receiver of the Toledo, St. Louis & Kansas City. J. C. Gleason, at present Superintendent of Transportation, will be made Superintendent. Chief Train Dispatcher Stroupe will be appointed Superintendent of Telegraph. The headquarters are at Cincinnati, O.

Dayton & Union.—Charles Treble, who has been Roundhouse Foreman of the Cleveland, Cincinnati, Chicago & St. Louis at Wabash, Ind., has been appointed Superintendent in charge of the locomotive and car department of the D. & U., with headquarters at Dayton, O.

Fitchburg.—C. L. Mayne, General Superintendent, with headquarters at Boston, Mass., has resigned, to take effect Dec. 31.

Gulf & Interstate.—The general offices have been removed from Bolivar Point, Tex., to Galveston, Tex.

Illinois Central.—L. L. Dawson has been appointed Master Mechanic, succeeding W. B. Baldwin, with headquarters at McComb City, Miss. Mr. Dawson was heretofore Master Mechanic at Memphis, Tenn.

Kansas City, Memphis & Birmingham.—J. H. Ashley has been appointed Car Service Agent, with headquarters at Kansas City.

Kansas City, Pittsburgh & Gulf.—J. R. Groves has been appointed Master Mechanic of the Kansas Midland Division, with headquarters at Wichita, Kan. He succeeds C. A. DeHaven, promoted.

Louisiana & Arkansas.—Elmer Richards, heretofore Trainmaster of the St. Louis Southwestern, at Pine Bluff, Ark., has been appointed General Superintendent of the L. & A., with headquarters at Stamps, Ark.

Mexican Central.—John Vance has resigned as Foreman of the Car Department, and is succeeded by M. F. Campbell, with headquarters at Mexico, Mex.

Missouri, Kansas & Texas.—R. W. Hockaday, formerly Traveling Freight Agent at Kansas City, has been appointed General Agent in charge of the freight and passenger business at Denver, Col. He is succeeded at Kansas City by R. F. Campbell.

New York, New Haven & Hartford.—At the annual meeting of the Providence & Springfield Division of the New England, Edward G. Buckland was elected Treasurer, succeeding Wm. H. Pope, with headquarters at Providence, R. I.

Norfolk & Western.—D. E. Spangler has been appointed Car Service Agent, with headquarters at Roanoke, Va., succeeding A. W. Towles, resigned.

Northern Pacific.—F. M. Gilbert, lately connected with the National Electric Car Lighting Co., has been appointed Engineer of Tests and an assistant in the Motive Power Department, with headquarters at St. Paul, Minn. Mr. Gilbert will also have charge of all electrical work on the line.

Pennsylvania Company.—W. M. Murdock advises that he has not been appointed Assistant Engineer Maintenance of Way. The position to which he has been appointed is that of assistant on an engineering corps on the Toledo Division. (Dec. 3, p. 884.)

Pittsburgh & Connellsville.—The Directors elected at the annual meeting of this line, leased to the Baltimore & Ohio, are as follows: Orland Smith, John K. Shaw, Mendes Cohen, C. Donnelly, C. L. Fitzhugh, Geo. A. Berry, W. H. Koontz, Findley H. Burns, W. C. Magee, Wm. Gibson, D. H. Gillespie and A. H. Lang.

St. Louis & San Francisco.—A. D. Lightner, heretofore General Agent, Freight Department, at Dallas, Tex., has been appointed General Agent at St. Louis, Mo., succeeding Chas. Hall, promoted. (Dec. 2, p. 867.)

St. Louis, Iron Mountain & Southern.—W. B. Bates has been appointed Master Mechanic of the shops at Memphis, Tenn.

Texas & Pacific.—H. C. Wombledorf, formerly Car Foreman of the St. Louis Southwestern, with headquarters at Tyler, Tex., has been appointed Foreman of Car Inspectors over the entire line, with headquarters at Marshall, Tex.

Union Pacific.—J. H. Manning, Master Mechanic at Omaha, Neb., has been transferred to Cheyenne, succeeding T. A. Davies, transferred. M. K. Barnum, of North Platte, Neb., succeeds Mr. Manning at Omaha, Neb. Mr. Davies will have charge of the Mechanical Department at Ogden, Utah.

W. R. McKeen, Jr., has been appointed Master Mechanic, succeeding M. K. Barnum, with headquarters at North Platte, Neb.

Vandalla.—John M. Chesbrough, Northeastern Passenger Agent of the Cincinnati, New Orleans & Texas Pacific at Detroit, Mich., has been appointed to his old position, that of Assistant General Passenger Agent of this line, with headquarters in St. Louis, Mo. W. F. Brunner, who has held the position now filled by Mr. Chesbrough, has been assigned to other duties in the General Passenger Department. Mr. Brunner was appointed Assistant General Passenger Agent on the resignation of Mr. Chesbrough a few years ago.

RAILROAD CONSTRUCTION, New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—Permission has been given by the San Diego, Cal., Council to the Southern California Division to lay tracks along Atlantic St. for six blocks, in order to reach the docks.

ATLANTIC COAST LINE.—Grading was begun Dec. 2 on the extension from Denmark, S. C., north-west 34.7 miles to Robbins. The general contractors, Abercrombie & Williams, of Montgomery, Ala., have subcontracted several sections. The line is to be completed May 1. (Nov. 18, p. 838.)

BALTIMORE & OHIO.—In the annual report it is stated that there was \$377,912 expended in improvements on the main stem and branches. Of this \$34,500 was spent in sidings, and \$42,900 in the change of line and grade at Tabb, Tabler's and Myer's Hole. In changing the grade on the Baltimore & Philadelphia Division \$28,000 was spent. On the Pittsburgh & Connellsville line of the Pittsburgh Division there was \$310,600 expended, of which \$143,250 was on change of grade and masonry.

The filling in of the gully between Glenwood and Pittsburgh, which has been in progress for several months, is about one-third completed. Jones & Laughlin have the contract.

BALTIMORE & SOUTHERN.—According to press reports, negotiations are completed for immediate building of this line from Baltimore south through Anne Arundel and Calvert counties to Drum Point Harbor, at the mouth of Patuxent River, 80 miles. It is stated that the franchises and right of way were obtained in 1892 by Edward Lauterbach, of New York, and that he is at the head of a syndicate which will furnish \$415,000 to complete the line.

BANGOR & PORTLAND.—Henry I. Hoffman of Achermanville, Pa., has the contract for building the two miles of extension from West Bangor, Pa., to the American Bangor quarry. (May 13, p. 348.)

BLACK DIAMOND.—The Ghent-Vevay Bridge & Terminal Co. was incorporated in Kentucky Dec. 6, to build a bridge across the Ohio River, between Ghent, Ky., and Vevay, Ind., for the northwestern outlet of the Black Diamond system. The Ohio River bridge between Dover, Ky., and Ripley, known as the Dover-Ripley Bridge & Terminal,

was chartered exactly a year before. Four bridges have been located and now await the approval of their sites by the Secretary of War. The bridges will be declared toll railroad bridges, open to any railroad company desiring to use them. Albert E. Boone of Zanesville, O., is President of both companies. The address of Sir Thomas Tancred, the English engineer who has been making a preliminary survey for the English syndicate, is London, Eng. A map showing 1,322 miles of located lines may be seen at this office. (Dec. 2, p. 867.)

BOSTON & MAINE.—The Massachusetts Railroad Commissioners have approved the plan for the relocation of the tracks of the Connecticut River Division as to grade. The relocation carries out the decree of the Commission on grade separation on the crossings of several highways.

BROOKVILLE.—G. W. Smith of Corsica, Pa., has the contract for building from two to three miles of spur between Summit, Pa., and Blowtown. (Official.)

BUFFALO, ROCHESTER & PITTSBURGH.—The headings of the tunnel near Cowansville, Pa., on the Allegheny & Western extension to Newcastle, have been brought together and the excavation is to be finished before the end of the year. The tunnel through Simpson Hill was finished some weeks ago.

CANADIAN PACIFIC.—On the Crow's Nest Pass extension from Lethbridge, Northwest Territory, west to Kootenay Lake, B. C., trains are running as far as Cranbrook, 200 miles. From Kushonook, on Lake Kootenay, the cars will be taken by barges down the lake and the Kootenay River to Nelson, B. C., where connection will be made with the company's Columbia & Kootenay branch, thus giving traffic arrangements both ways to Rossland without breaking bulk. The company has two years in which to complete the line to Nelson, and Vice-President Shaughnessy states that the terms will be carried out to the letter. From Lethbridge the line runs via McLeod and Pincher Creek. After leaving the Crow's Nest Pass, which lies on the boundary line between Alberta and British Columbia, the line follows pretty closely the stream known as the Middle Fork, after taking a southerly course along the Michael River to the region of the Elk River. Crossing the Kootenay River into the East Kootenay mining country, it goes up the west side of the river for 50 miles to Cranbrook, thence it crosses the summit of the Purcell Range of the Selkirk Mountains to Moyie River, which it follows for 50 miles until it strikes the Great River Valley, following that river to the head of Kootenay Lake. The gold mines, of which so much has been heard, lie in the Elk River district beyond the Crow's Nest Pass. The road possesses great advantages in that it establishes a communication between the gold and the coke which is required for smelting. It also goes up the East Kootenay Mountain country, which is most promising. The country crossed by the railroad is mountainous, but the valleys are wide and contain much land good for agricultural purposes, besides fine grazing lands. The lake and waterways are navigable the year round.

From Morrissey Creek, about 41 miles west of the summit, it is intended to build a branch eastward up the creek about four or five miles to the coal deposits. A branch to Port Steele is under consideration, to run up the east side of the Kootenay River to Windermere, thence west across the river and up Toby Creek; thence over the Selkirk Range to the foot of Duncan Lake, and from there up the Lado River to Trout Lake, thence northwest in as direct a line as possible to the Revelstoke branch of the C. P. The extension of the main line from Kushonook will be up the West side of Kootenay Lake to Nelson. The C. P. is also considering the question of building a line into the Yimí and Salmo districts. A survey has been made and it is stated that the route is practicable.

CENTER & TENAHA.—Nothing has been done this winter on the grading of this line from Tenaha, Tex., south 11 miles to Center. (June 2, p. 466.) It is proposed, however, to finish the grading early next year, and to put the road in operation. S. T. Flesman of Center, Tex., is Superintendent. (Official.)

CHICAGO & NORTHWESTERN.—Improvements are reported in progress between Henderson and Blakely, Minn. The track is being straightened and the old 12-lb. and 80-lb. rails are being replaced with new 80-lb. rails. A large amount of riprapping is being done to protect the embankment. The improvements contemplated for next year include the straightening out of curves and laying new rails between Belle Plaine and Kasota, Minn. The expenditures will amount to from \$300,000 to \$400,000.

An ordinance has been introduced into the Omaha City Council to give this line a 20-ft. strip of land along the west side of Fourteenth St. to Nicholas St.

CHICAGO, BURLINGTON & QUINCY.—The improvements at Quincy, Ill., which have been under way for a year, are reported nearly completed. The bridge over the Mississippi has been rebuilt and the embankment, 40 ft. in width and one mile in length, is ready for tracklaying. The freight house and the depot will be completed in a few weeks. Work which has been in progress for nearly two years on the freight yard in Chicago, Ill., has been completed, and they were open for business Dec. 5. The yard runs from West Forty-eighth to Perry Ave., a distance of two miles, and is nearly three-fourths of a mile in width. Sixteen tracks have been laid, and there is room for 524 cars.

CHICAGO, MILWAUKEE & ST. PAUL.—This company is reported to have decided to build a spur 2½ miles long from Cassford's station between Elkhorn and Delavan, Wis., to run southeast to Inlet Bridge on Delavan Lake.

Surveys are reported in progress for a spur of five miles to connect the Ontonagon branch with Crystal Falls, Mich., in the Northern Peninsula.

CHICAGO, ROCK ISLAND & PACIFIC.—Between Clyde and Mankato, Kan., about 25 miles of ballasting has been completed.

CHICAGO TERMINAL TRANSFER.—Official confirmation is received of the report that the company proposes to make an extension from Harvey, near Chicago, to Chicago Heights, nine miles. (Dec. 9, p. 885.)

COAHUILA CENTRAL.—This company will build a line from Saltillo, Mex., via Ramos Arista to Trevino, 60 miles, and thence to Sierra Majado, 102 miles. The road is permanently located to Trevino and the

contract for grading and tracklaying let to C. E. Corn, Saltillo. Thirty men and 20 teams are at work and about eight km. is graded. The work is not difficult, requiring about 8,000 yds. to the mile. The maximum grade is 2 per cent., and the maximum curve 8°. There will be one steel bridge of 125 ft. span. S. J. Martin is President and S. Potts Chief Engineer, both of Saltillo. W. E. Darwin, 304 Tacoma Building, Chicago, is General Manager. (Official.)

COAST RAILWAY OF NOVA SCOTIA.—Little progress has been made on the 21 miles of line now building from East Pubnico along the coast. The greater part of the masonry is about finished. The grading is well ahead and the ties are on the ground. It is hoped that the work will be pushed so that the line may be operated to Barrington at the opening of the next season. (Nov. 18, p. 838.)

COBOURG, NORTHUMBERLAND & PACIFIC.—The £91,200 of 5 per cent. bonds for this road lately offered for sale in England do not seem to have been taken up very rapidly so far. The line as located is nearly 50 miles long and runs from Cobourg via Baltimore, Centreton, Wardworth, Campbellford and Rawdon to a connection with the C. P. and the Central Ontario. The maximum curve is 6°. From Cobourg there is a nearly continuous grade for about 15 miles to where it crosses the Divide, 720 ft. above the Lakes. There is only one bridge of extent, which crosses the River Trent at the north end of Campbellford Village. The heaviest work will be from the summit east for about 15 miles.

COLUMBUS, LIMA & MILWAUKEE.—Press reports announce that 10 miles of track is ready for ballasting on this line between Defiance, O., and Lima. It is thought that with good weather the road will be ready for rolling stock by the middle of February. (Dec. 2, p. 867.)

CONESUS LAKE.—This company proposes to build one mile of extension from Lakeville, N. Y., to Pebble Beach. (Official.)

DES ARC & NORTHERN.—Application has been made to the Secretary of State at Little Rock, Ark., for an amendment of the charter to increase the capital stock from \$150,000 to \$300,000. The line is about completed from Higginson southeast 19½ miles to Des Arc. (May 23, p. 382.)

DURHAM & CHARLOTTE.—This road, which has been extended from Glendon to Putnam, N. C., will be built another year to Troy, and 11 miles of the road are now building. (July 22, p. 538.) F. D. Jones, of Gulf, N. C., is Superintendent. (Official.)

EDMONTON DISTRICT.—This company, whose application will be made at the next Dominion session for certain changes, was incorporated by the Act of Parliament in 1896, the incorporators being H. C. Wilson, of Edmonton, B. C., and W. T. Jennings, of Toronto. The line is projected to run from the terminus of the Calgary & Edmonton at South Edmonton to Edmonton, with lines from Edmonton northwest via Albert to the Athabasca River near Ft. Assiniboia with a branch to the Stony Plains, also from Edmonton northeast to or near Ft. Saskatchewan with a branch to the Sturgeon River. At the 1898 session the company was further empowered to build from its point of connection with the Athabasca River to the Peace River, thence to the Nelson River via the Nelson and Francis Rivers to the navigable waters of the Telly River. The company also has power to operate vessels on these rivers. This charter has been said by the original promoters, the present owners being Hon. W. Pugsley, George McAvity and A. G. Blair, Jr., of St. John, N. B. Surveys are being made and building will be begun from South Edmonton to Edmonton as soon as the bridge over the North Saskatchewan River, now being built by the Dominion Government, is completed. (Dec. 9, p. 885.)

FAIRCHILD & NORTHEASTERN.—The company proposes to extend its line through Shilling, Wis., to Bright, six miles. (Aug. 12, p. 587.) M. C. Foster of Fairchild, Wis., is President. (Official.)

GALVESTON, BRAZOS & SOUTHWESTERN.—No track is laid yet on this line, but 30 miles is graded, and the company proposes to resume building soon from Galveston, Tex., west 300 miles to San Antonio. (Dec. 2, p. 867.) L. P. Featherstone, Galveston, is President and General Manager. (Official.)

GEORGES VALLEY.—It is proposed to extend this line from Union, Me., north 10 miles to Seamount. The line now runs from Warren north to Union. (Official.)

GULF & SHIP ISLAND.—The company proposes to extend its lines north about 200 miles from Hattiesburg, Miss., via Forest, Carthage and Houston, to Pontotoc. No definite plans for building have been made as yet, but the management hopes to begin at an early date an extension of from 30 to 50 miles. (Dec. 2, p. 868.) Another company, of which W. H. Hardy of Meridian, Miss., is President, is making arrangements to build a line from connection with the G. & S. I. near Maxie, to run west about 175 miles to Lumberton, Columbia, McComb City and Natchez. S. S. Bullis of Gulfport, Miss., is General Manager of the G. & S. I. (Official.)

GULF, LOUISIANA & GREAT NORTHERN.—Newspaper reports state that Wheeler & Boody, of 222 South Third street, Philadelphia, have the contract for building 270 miles of this road from Vermilion Bay, on the coast of Mexico, north via Alexandria and Arcadia, through the state of Louisiana to the Arkansas state line. Joseph J. Waltz, of Alexandria, La., is President and General Manager.

GULF, TEXAS & NORTHERN.—Judge James, C. W. Meeks and C. S. Breckenridge, of Orange, Tex., have made application to the State Railroad Commission for authority to issue bonds on 200 miles of this road from Orange, Tex., north to Marshall. The company was incorporated about six months ago and surveys were recently begun. (Sept. 2, p. 639.)

GUTHRIE, LANGSTON & DOWNES.—Press reports from Fort Worth, Tex., state that this company is being organized to build a railroad from Langston, Okla. Ter., west about 30 miles through Guthrie to Downes. The capital stock is \$2,000,000 and it is proposed to use the road as a connecting link for some through line.

ILLINOIS CENTRAL.—The refusal of the Orleans Levee Board to permit the use of the river front for trackage purposes will be reconsidered, according to press reports, and it is expected that a sat-

satisfactory agreement between the Levee Board and the I. C. will be arranged soon. (Dec. 9, p. 885.)

INTERNATIONAL & GREAT NORTHERN.—L. Trice, General Superintendent, is quoted as stating that the company will tunnel Preston St. in Houston, Tex., in co-operation with the city is obtained. Engineers are engaged in preliminaries. The estimated cost is \$40,000.

KANSAS CITY, ELDORADO & SOUTHERN.—This line, which was completed some months ago from Walker, Mo., to West Eldorado (July 22, p. 535), 12 miles, is to be extended to Eldorado Springs, 1½ miles. (Official.)

KANSAS CITY, FORT SCOTT & MEMPHIS.—The annual report of the Kansas City, Memphis & Birmingham states that there was 18.4 miles of ballast laid during the year, costing \$16,707. There was \$5,500 expended in new side tracks. In all \$42,900 was spent in betterments. On the Kansas City, Fort Scott & Memphis the annual report states that \$56,435 was spent in laying the new 75-lb. rail. In all 41 miles was laid with that class of rail. On this division \$115,339 was expended in betterments.

KETTLE VALEY.—The Senate at Washington has passed the bill granting a right of way for this road through the Coville Indian Reservation. The company was incorporated in March last to build a branch of Spokane Falls & Northern through this reservation to the International boundary. (April 1, p. 245.)

KINDERHOOK & HUDSON.—Bids have been received for an extension of this line from Neiverville, N. Y., north 40 miles. The contract includes 220,000 cu. yds. of earth, 11,800 cu. yds. rock, 5,300 cu. yds. masonry, 40 miles of track laying, nine steel plate girder bridges, one steel viaduct 1,900 ft. long, and 60 miles of wire fencing. (Nov. 25, p. 852.)

LAKE ERIE & DETROIT RIVER.—Nothing as yet is definitely determined as to the extension from Ridgeway, Ont., northwest to St. Thomas. On Nov. 10 last the company succeeded in obtaining bonuses in four municipalities out of five between the points mentioned. The matter of Government subsidy will be brought up at the Dominion Parliament early next year. (Dec. 2, p. 868.)

LITTLE KANAWHA.—This line, which has been completed from Parkersburg, W. Va., southeast 26 miles to Elizabeth, W. Va. (May 27, p. 383), is being extended from Palestine to Burnsville, 81 miles.

LITTLE RIVER VALLEY.—The company has completed its track from Morris Ferry, Ark., to the Indian Territory line. The line is to be extended into the Territory 40 miles from Morris Ferry. (Aug. 26, p. 619.) Frank Butts of Horatio, Ark., is Secretary. (Official.)

LOUISIANA & ARKANSAS.—Amended articles of incorporation were filed in Arkansas Dec. 6, for an increase of capital stock from \$150,000 to \$300,000, with authority to build the line from Sibley, La., southeast through the parishes of Webster, Blenville, Natchitoches and Winn. The L. & A. is practically completed to Cotton Valley, where it connects with the Arkansas, Louisiana & Southern to Sibley. The two lines are to be operated as one system.

LOWELL & HASTINGS.—W. A. Smith & Co. of Grand Rapids, Mich., have the contract for the extension from Lowell, Mich., north 17 miles to Belding. (Dec. 2, p. 868.) It is proposed to extend the line from Belding seven miles to Greenville, and from Freeport, at the south end, south, eight miles to Hastings. (Official.)

MILWAUKEE & SUPERIOR.—The company proposes to make an extension of this line from North Lake, Wis., west 29 miles to Juneau. (Jan. 14, p. 34.) It was completed to North Lake early this year.

MINNESOTA & NORTHERN WISCONSIN.—This company is building six miles of line from Nickerson, Minn., on the Great Northern, northwest into timber. (July 29, p. 555.) It is proposed to extend the line 10 miles further. (Official.)

MISSOURI PACIFIC.—New surveys are reported in progress for an extension from Little Rock, Ark., west to Greenwood, on account of the recent court decision against the use by this company of a portion of the Choctaw, Oklahoma & Gulf route. (Oct. 28, p. 786.)

NASHVILLE, CHATTANOOGA & ST. LOUIS.—A "Y" is being built at Martin, Tenn., to connect with the Illinois Central.

NATIONAL CENTRAL.—Representative McKissam of Ohio, on Dec. 12, introduced a bill into the House at Washington to incorporate this company to build an air line between New York and San Francisco of a length said to be 2,700 miles. The capital stock is placed at \$400,000,000. The rails are to be of a weight not less than 100 lbs. The schedule time is to be not less than 50 miles per hour, and when operated by electricity, not less than 70 miles, and the charge for transportation of passengers not to exceed two cents per mile. If the company elect the United States shall guarantee the interest on the bonds. The incorporators are William Dallin, J. C. Caldwell, I. N. Reed and J. C. Reynolds, of Chicago; H. V. Mercer, Goshen, Ind.; John C. Mellinger, Napanee, Ind.; James McPherson, Bowling Green, O., and Joseph Barrett, Buffalo. The bill was referred to the Committee on Judiciary.

NEW ROADS.—A. Knabb & Co., owners of a large lumber and stone plant at Krug, Garrett county, Md., have given out a contract, according to report, for lengthening their narrow gage line, which now runs from Friendsville to Hayes Run, to run south to Swallow Falls, from which point stages will be run to Oakland, seven miles.

Surveys are in progress, according to report, for a railroad from the Susquehanna branch of the Pennsylvania RR. at Carrolltown, in Cambria county, to the Birnes mine, on the farm of Peter Campbell, about one mile.

The Merchants and Manufacturers' Exchange of Detroit, Mich., has been trying to obtain a franchise from the Common Council for an elevated railroad along the Detroit River front at an expenditure of about \$5,000,000. Senator James B. McMillan is said to be back of the project.

Robert Gray, of Bristol, is reported making surveys for a line in Johnson county, Tenn., from the Holston Valley to Bristol. The work is in the interest of Dull & Erwin, who own timber lands in the country.

S. D. Porter, of Sandy Point, Tex., according to report, proposes to build a connecting line between the Sugar Land RR. and the Valasco Terminal. It will be 20 miles long, running through Brazoria, Tex.

NEW YORK & PENNSYLVANIA.—According to the contract made with Theodore Cobb, of Spring Mills, N. Y., the extension from Oswayo, Pa., west 11 miles to Millport is to be completed by Jan. 1. It is stated that much of the grading is already done, although the contract was signed only recently. (Dec. 9, p. 885.)

NEW YORK, NEW HAVEN & HARTFORD.—Residents of Norwich, Conn., have petitioned this company to connect the Providence and Willimantic Division at or near Versailles with the Norwich Division. This would require approximately four miles of road, and would give the Norwich people another line to Willimantic. President Clark has promised to lay the matter before the Board of Trustees at the next meeting.

NORTH BEND & KETTLE CREEK.—In addition to other extensions built the first part of the year (Aug. 26, p. 619), the company is building two branches of one mile each. (Official.)

NORTHERN PACIFIC.—Tacoma (Wash.), press dispatches state that this company has filed certificates of location at Olympia for 11 branch lines, including the Clearwater cutoff now building, which are to have a total mileage of 566. They pass through the wheat district of Eastern Washington, Oregon and Western Idaho, and run through the territory of existing lines of the Oregon Railroad & Navigation.

OREGON RAILROAD & NAVIGATION.—The only lines described last week in re-incorporation that are new are as follows: From Portland, Ore., northwest along the Columbia River, either on the north or south side, to the mouth of the river; from Dayton, Wash., north about 15 miles to Delaney; from Moscow, Idaho, south about 25 miles to Lewiston; from Biggs, Ore., south about 120 miles to Pineville (this is the same route as the Columbia Southern, now building); from Elgin, Ore., southeast 50 miles to Wallawa.

PENNSYLVANIA.—Work on the filling in on Pennsylvania Ave., in the Eighteenth Ward of Johnstown, Pa., is progressing rapidly. A narrow gage track has been laid along that street as far as Fairfield Ave.

The matter of building a subway at Harrisburg, Pa., at the Market St. crossing, is still in the hands of the Citizens' Committee. If the project is carried through, this line and the Philadelphia & Reading will have to raise their tracks at that street.

PINE BLUFF & ARKANSAS RIVER.—The gage was changed from narrow to standard on this line on Aug. 7 (Apr. 1, p. 246). It extends from Rob Roy, Ark., to English, 23 miles, and is proposed to extend from English northeast eight miles to Bayou Meto. (Official.)

PITTSBURGH & LAKE ERIE.—Between McKee's Rocks and Monaca, Pa., a distance of 21.4 miles, third and fourth tracks have been laid for about half the distance. It is expected that a third main track will be laid to Monaca within a few months.

RALEIGH & CAPE FEAR.—It has been decided to issue \$60,000 in bonds for building an additional seven miles of this line, which now runs from Raleigh, N. C., to McCullers, 12 miles. The line is projected to extend to Stanhope, in all 25 miles.

SCRANTON, HONESDALE & EASTERN.—A Chicago firm of contractors is reported to have taken the contract for building the tunnel through the Moosic Mountain, to be completed within one year from Jan. 1 next. The tunnel will be 6,842 ft. long, 14 ft. high and 14 ft. wide. The contract price is said to be \$421,730. It is said that the Delaware & Hudson Canal Co. is back of the project. (Dec. 9, p. 885.)

SAGINAW SOUTHERN.—Representative Norton of Ohio, on Dec. 8, introduced a bill into the House at Washington granting this company right of way through the San Francisco Mountains forest preserve. The road is to be built from a point on the Santa Fe Pacific at Williams, Ariz., thence south by the most practical route to Jerome. The bill provides that no timber shall be cut by the railroad. J. C. Brown of Williams, is President and General Manager. (Oct. 28, p. 786.)

SHERMAN, SHREVEPORT & SOUTHERN.—This company proposes to build an extension from Jefferson, Tex., southeast 28 miles to Waskom. (Official.)

SOUTHERN PACIFIC.—The cost of betterments on the line proper, as given in the annual report, amounted to \$1,247,355. The main item of expense is that of ballast, on which \$329,600 was spent. The Galveston, Harrisburg & San Antonio Division received \$132,175 for improvements.

The narrow-gage line in Oakland, Cal., has been converted to standard gage. The work, which has been in progress for some months, was completed Dec. 2.

SUMMERVILLE, BLUE MOUNTAIN & WALLA WALLA.—L. B. Reinhart, of Union City, Ore., is in charge of a survey to locate this line from Walla Walla, Wash., to Union, Ore.

TACOMA & COLUMBIA RIVER.—The building of the deep water terminals at Tacoma, Wash., is under way. Tacoma reports state that the contract for the work takes the line from the crossing of the Northern Pacific tracks in a northerly direction across the tide flats, parallel with the city waterway about a mile to a point half way between the commercial dock and the St. Paul mill wharf. The location affords chance for spurs and sidings on the west side of the city waterway, and on the east side to several factories.

D. N. Lydell of Spanaway, Wash., has the contract for extending this line from Lake Park south six miles and from Tacoma to Lake City, 12 miles. (April 22, p. 301.) It is proposed to continue as far as Kapousin, eight miles. (Official.)

TENNESSEE CENTRAL.—Naugle, Holcomb & Co., 355 Dearborn street, Chicago, have the general contract for building the extension of this line from Monterey, Tenn., via Crossville and Rockwood to Harriman, Tenn., with a further extension to Clarks-ville, 155 miles. There are to be several important

bridges, including one across the Cumberland River at Nashville at an estimated cost of \$50,000, another over Caney Fork and the third over the Calf Killer, in the Cumberland Mountains. Much of the contract will be sublet. Jere Baxter, of Nashville, Tenn., is President. (Dec. 2, p. 868.)

TEXARKANA & SHREVEPORT.—This line is now operated between Texarkana and Kiblah, 34 miles, and the company proposes to build an extension from Kiblah to Shreveport, 18 miles. (Dec. 9, p. 886.)

TOLEDO & OTTAWA BEACH.—All of the grading in the state of Ohio is reported completed on this line from Toledo north 40 miles to Trenton, Mich., and it is expected that the grading will be completed on the entire line ready for rails in the spring. The Ferguson Contracting Co., of New York, has the contract. Joseph K. Duffy, of Toledo, O., is Vice President and General Manager. (May 27, p. 383.)

TOLUCA & EASTERN.—This company, which owns six miles of road, proposes to extend its line from Toluca, Ill., north 30 miles to Marquette. C. J. Devlin, of Topeka, Kan., is President and Treasurer. (Official.)

UNION COVE & VALLEY.—Work has been suspended on account of bad weather on this line from Union, Ore., north 12 miles to Cove. (Sept. 30, p. 715.)

UNION SPRINGS & NORTHERN.—This company, to which reference was made Dec. 2, (p. 868), is not yet incorporated, but has filed its declaration. The capital stock is \$10,000, and the proposed route is from Union Springs, Bullock county, Ala., north to Fort Davis. The incorporators are T. P. McIver, W. R. Meyeaunt, Charleston; W. E. Dicken, B. F. Hitch, W. D. Newcome, J. D. Harden, Quitman, Ga., and G. A. Croft, Cincinnati.

UTAH & PACIFIC.—Twenty miles of track is laid on this line from Milford, Utah, southwest 76 miles to the Nevada state line. A. W. McCune of Salt Lake City, Utah, is President. (Dec. 2, p. 868.)

WABASH.—Press reports state that the company has begun unloading materials at Moulton, Ia., for the proposed cutoff from that city north 27 miles to Albia. (Sept. 23, p. 698.)

WADLEY & MT. VERNON.—This line, which runs from Wadley, Ga., to Rixville, is to be extended southwest 75 miles to Fitzgerald. The section to Pendleton, five miles, is now building. (Official.)

WASHINGTON RUN.—The route of this line is from Layton, Pa., on the Baltimore & Ohio, to the Washington Coal & Coke Company's mines, five miles. (Dec. 2, p. 868.) Surveys have been completed. Bennett & Talbot, of Greensburg, Pa., have the contract for grading, masonry and track laying. The Pencoyd Bridge Company has the contract for the bridges. Grading was begun Dec. 6. There will be 900 lineal ft. of viaduct and bridges and 250 ft. of tunnel. The maximum grades are 1.9 per cent, and the maximum curves 10°. The weight of rails is 85 lbs. W. Harry Brown, Conestoga Bldg., Pittsburg, Pa., is President; John H. Wurtz, Dawson, Pa., Secretary and Treasurer, and E. J. Taylor, McKeesport, Pa., Chief Engineer. (Official.)

WAYCROSS AIR LINE.—J. H. Powers of Douglas, Ga., has the contract for building 3¼ miles of extension from Douglas to Ashley. (Official.)

WHEELING & LAKE ERIE.—The cut which replaced the Dillonville Tunnel at Martin's Ferry, O., on which Contractor T. J. Stringer of Portland, O., has been engaged for nearly a year, has been completed. The tunnel was 450 ft. long and its roof consisted of loose shale, which necessitated frequent repairs. (Dec. 24, p. 920.)

Electric Railroad Construction.

ALLENTOWN, PA.—The Allentown & Slatington St. Ry. Co. was chartered Dec. 2 to build an electric railroad 17 miles long, to connect the places named. The capital stock is \$200,000. Francis J. Crilly is President. John L. Schwartz, Patrick F. Cannon and Walter J. Saeger of Allentown, and Francis A. Kreitz of Slatington are Directors.

BELLOWS FALLS, VT.—Surveys have been made for the recently incorporated Bellows Falls & Saxtons River St. Ry. Co. The proposed road is to run from Bellows Falls to Rockingham and Westminster, six miles. J. H. Holton of Burlington is President. (Oct. 7, p. 732.)

BOSTON, MASS.—Carl Dickenson, Harry F. Downs, Rufus H. Savage and others are seeking the incorporation of a company to be known as the Waltham, Ayer & Pepperell St. Ry. Co., with authority to build and operate between Waltham and Pepperell.

BROOKLYN, N. Y.—The Brooklyn Heights RR. Co., in order to have a direct line from Park Row, New York, to Brighton Beach, has bought some land on West Eighth St., Coney Island, to lay additional tracks. Tracks will be laid from the Seabeach Palace, where the cars now stop, to connect with the Seaview RR. elevated structure by an inclined plane, and then continuing to Brighton Beach.

CHICAGO, ILL.—Four ordinances asking for 50-year street railroad franchises have been introduced into the Town Board of Cicero. The railroad companies asking for the franchises are the Cicero & Proviso St. Ry. Co., Suburban RR. Co., Ogden St. Ry. Co. and the Cicero & Harlem St. Ry., which is owned by the Lake St. Elevated RR.

CLEVELAND, O.—R. L. Palmer, General Manager of the Cleveland & Chagrin Falls Electric Ry., informs us that the extension of the company's lines to Warren, Pa., is being built by a separate company incorporated for that purpose, the officers of which are: President, R. S. Hubbard, former County Treasurer; Vice-President, C. E. Morganthaler of Cleveland; Secretary, J. E. Latimer, and F. B. Nichols and E. J. Kennedy make up the five Directors. The road is to be 14 miles, single track, and is to run from Chagrin Falls through Russell, Newbury and Punder-sons Lake to Burton, Geauga Co., O. The grading is completed, with the exception of three-quarters of a mile. A Hoag of Cleveland has the contract for overhead work, and the Ohio Brass Co. of Mansfield, O., is supplying the overhead material. No large trestles or bridges are to be built. The road is bonded for \$300,000, part of which is to be used for this com-

pany and part for the company contemplating going from Newbury to Hiram, Garrettsville and Warren, O. The power will be furnished from the Cleveland & Chagrin Falls Company's power house by placing in some additional boilers and generators. The company will have to purchase a few more cars later. The office of the C. C. F. E. Ry. is 404 American Trust Bldg., Cleveland, O.

CUMBERLAND, MD.—The survey for the proposed electric railroad from Cumberland to Westernport, 30 miles, has been begun. Engineer G. B. Howell of Philadelphia, represents the company. (March 11, p. 189.)

DAHLONEGA, GA.—J. W. Adams, President of the Dahlonega Gold Mining Co., and J. H. Smith of Findlay, O., are said to be interested in the building of an electric railroad from the company's mines to connect with the Southern Ry.

DOYLESTOWN, PA.—The Inland Traction Co. and the Quakertown & Doylestown Trolley Co. have each petitioned the Perkasie Borough Council to build through that town. If the franchise is granted, the work is to begin within six months, and to be finished within a year. Both companies applied for a franchise on practically the same route.

GREENFIELD, IND.—Richard A. Black of Greenfield informs us that he, with a number of other gentlemen, have secured a franchise over the "National Road" for an electric line in Hancock county. It is their purpose to build a road from Greenfield to Indianapolis, 20 miles, but before taking steps in the matter it is necessary to procure the right of way over that part of the "National Road" in Marion county, the county in which Indianapolis is located. Application for this right of way has already been filed with the Board of Commissioners of Marion county. In case the petition should be granted, a corporation will be organized and work begun.

HAMILTON, ONT.—Nesbitt, Gauld & Dickson will apply at the next session of the Ontario Legislature, which meets early in 1899, for the incorporation of a company to build a railroad from Hamilton to Caledonia and to further extend the railroad to Lake Erie, near the village of Selkirk. The Secretary of the syndicate is Walter Anderson, King St., E., Hamilton. The proposed capital stock is \$250,000. When the franchise is granted the work will begin immediately on the road from Caledonia to Hamilton, about 14 miles. When that is finished 12 miles more will be built to Cayuga. The application is for power to operate the road with either steam, compressed air or electricity.

HAMMONTON, N. J.—W. I. Garrison, Frank Sanders, Henry Wootten, Smith Conover and Samuel Riley of Atlantic City, have petitioned the Hammonton Town Council for a franchise to build an electric railroad in the streets of Hammonton, together with the proposed system from Camden to Atlantic City.

INDIANAPOLIS, IND.—N. N. Morris of Indianapolis is seeking a franchise for an electric railroad from Irvington east to the county line to Greenfield, Hancock Co. No organization of the company to build this proposed line has been perfected.

KANSAS CITY, MO.—The East Side Electric St. Ry. Co. has secured permission to take up the tracks of the defunct East Fifth St. road and to begin work on its own line. Joseph J. Helm is interested in the new work.

LOS ANGELES, CAL.—T. E. Gibbon, Vice-President of the Los Angeles Terminal Ry., has made application that a franchise be offered for sale for building and maintaining a line of single track electric railroad on Colorado St., from the place where the Los Angeles Terminal Ry. now terminates, to Raymond Ave. and through other streets. (Aug. 26, p. 619.)

MACON, GA.—The Macon & Indian Springs St. Ry. Co. has started work on the new electric plant that is to furnish the city with light. (May 20, p. 367.)

MERIDEN, CONN.—The Meriden, Southington & Compounce Trolley Co. has given notice of a petition to the next Legislature to increase its capital stock to \$500,000 and to extend its line to Waterbury, Cheshire Mountain, Carmel, Berlin and certain Meriden streets, the latter involving extensions of about 40 miles. The company now operates eight miles of road. Francis Atwater, President of the Meriden Board of Trade, is President. (March 25, p. 225.)

MIDDLEBORO, MASS.—The Directors of the recently incorporated Taunton & Middleboro St. Ry. have petitioned the Selectmen of the town of Lakeville for the location of the company's tracks through that town. The Directors of the T. & M. St. Ry. are: Charles H. Wilson, Fred C. Hinds, Abbott P. Smith, Augustus M. Bearse, John H. Nelson, Isaac Sampson, Sidney T. Nelson. (Nov. 18, p. 834.)

MILWAUKEE, WIS.—The Milwaukee Electric Ry. & Light Co. opened on Dec. 6 its new electric line to Wauwatosa. This line was formerly called the Dummy Line.

MONTGOMERY, PA.—The Montgomery & Chester Electric Ry. Co. was chartered in Pennsylvania Dec. 9, to build an electric railroad 15 miles long, connecting the boroughs of Pottstown and Phoenixville. The capital stock is \$300,000. Daniel S. Mann is President of the company, and Wm. H. Grebe, Claude S. Jarvis, Geo. G. Fittler, Philadelphia; Geo. F. P. Wanger, Pottstown, and J. G. MacPherson, Washington, D. C., are Directors.

MT. VERNON, N. Y.—The Common Council, at a meeting Dec. 6, granted a franchise to the New York, West Chester & Connecticut Traction Co., for a line on Chester Hill, and also to build extensions through the city to connect with lines to be built to Pelham, White Plains and Harlem. (Dec. 9, p. 886.)

NEW BRUNSWICK, N. J.—The Brunswick Traction Co. has secured a franchise from the Borough Council of Bound Brook, giving the company permission to build from the Green Park bridge into the city. This is the connecting link in the line through New Brunswick to Plainfield. When completed, it will give an uninterrupted line from New Brunswick, 12 miles to Summerville in one direction, and 15 miles to Plainfield in another.

NEWPORT NEWS, VA.—The Peninsula Ry. Co. of Newport News has been granted a franchise in Hampton, Va. John G. Litzzy, W. A. Post and W. E. Cottrell of Newport News are interested. (Nov. 11, p. 821.)

NEW YORK, N. Y.—Bridge Commissioner Shea announced on Dec. 9 that he expected to have the controversy with the electric railroad companies in regard to an increase in the tolls for the privilege of crossing the New York & Brooklyn Bridge settled up before the end of the year. The toll at present is five cents for each car for a round trip, and Mr. Shea demands double this amount. He said it is probable that if the toll question is satisfactorily settled the application of the companies for two additional loops at the Manhattan end of the bridge will be granted. These extra loops will be a great convenience and do away with considerable of the overcrowding. The scheme for having an inclined plane in Washington street at the Brooklyn end has been abandoned.

OMAHA, NEB.—The citizens of Omaha have presented a petition to the City Council asking that a franchise be granted to the Omaha St. Ry. Co. permitting them to build an extension to South Omaha and other lines in North Omaha. Frank Murphy is President of the Omaha St. Ry. Co.

PALMER, MASS.—The Palmer & Monson St. Ry. Co. has been granted a franchise in Ware, Mass., which requires that the line be built before Jan. 1. Chas. F. Grosvenor is President. (Oct. 7, p. 733.)

PHILADELPHIA, PA.—J. S. Austin, President of the Delaware County & Philadelphia Electric Ry. Co., informs us that 10 miles of electric railroad has been built and the road is in operation between Augora and Media, on the Baltimore Turnpike, passing through Lansdowne, Clifton Heights, Morton, Wallingford and Media. The proposed equipment for the road is 10 open and eight closed motor cars. The officers are: President, Jas. S. Austin; Vice-President, Edward V. Kane; Secretary, Treasurer and General Manager, Samuel Haight. (Dec. 9, p. 886.)

An ordinance to amend the original charter of the Delaware & Schuylkill Electric Ry. Co., granted in June, 1896, is now under consideration by the City Council. The ordinance allows the company to abandon portions of its original route and empowers it to build on other streets. The laying of the new tracks to be finished by June, 1899.

PINE BLUFF, ARK.—The Pine Bluff Electric Light & St. Ry. Co. was incorporated Dec. 6, with a capital stock of \$300,000, of which \$175 has been subscribed. The incorporators are: Thomas L. Chadbourne, Jr., Henry C. Wood, attorneys, of Chicago, Ill.; H. H. Hunn, Sam M. Taylor, Peter P. Byrd, Jeff Hicks and Sebastian Gesireiter, all of Pine Bluff. Officers have been elected as follows: Jeff. Hicks, President; Thomas L. Chadbourne, Jr., Vice-President; H. H. Hunn, Secretary and Treasurer. The Board of Directors is composed of the above officers and Henry C. Wood, Sebastian Gesireiter, Peter B. Byrd and Sam M. Taylor. Work is to be begun in January.

PITTSBURGH, PA.—The Monongahela Traction Co. has opened its new line to Homestead and Bradford, abandoning that portion from Schenly Park to Bouquet St. (June 17, p. 445.)

PONTIAC, MICH.—John Winters of Detroit is seeking a franchise for an electric railroad from Pontiac to Orion.

RACINE, WIS.—The Milwaukee, Racine & Kenosha Electric Ry. proposes to build an extension of the present line through Kenosha from the northern city limits to the southern city limits, about two miles, new securities being issued to meet the expenditures. One swing bridge will have to be built on the route. Matthew Slush is President; J. M. Blatt, Superintendent, Racine.

RICHMOND, IND.—Wm. A. Pickens of Chicago, Ill., has petitioned the City Council of Richmond for a franchise to build a railroad, to be either steam, electric or other motive power. No route for the proposed road has been decided upon, but it will probably connect Evansville and Terre Haute with coal fields.

SARATOGA, N. Y.—An extension of the Saratoga Traction Co. is reported soon to be made from the Geysers to Ballston Spa, about five miles. T. F. Hamilton, President.

SCRANTON, PA.—The Nay-Aug Park St. Ry. Co. was chartered in Pennsylvania Nov. 17, to build an electric railroad five miles long in Scranton and its vicinity. The capital stock is \$50,000. James L. Crawford, President; George F. Reynolds, George E. Hill, C. E. Reynolds, Thos. F. Penman and Herman Osthaus, Scranton, Directors.

WASHINGTON, D. C.—Senator Faulkner has introduced a bill into the Senate authorizing the Metropolitan RR. Co. to extend by double track its 22 miles of underground electric road from the S. W. corner of Lincoln Park and North Carolina avenue and Eleventh street, S. E. south on Eleventh street to F street, and thence by single track along Eleventh street to a point north of the tracks of the Anacostia & Potomac River RR. Co.; thence east on G street to Twelfth street, north on Twelfth street to F street; thence west on F street to Fourteenth street; to connect with the double tracks of the company there.

WHEELING, W. VA.—The Wheeling & Elmgrove Ry. has made application for a franchise for extensions of its lines through the city streets. (Sept. 23, p. 697.)

WINTHROP, MASS.—The Winthrop & Revere St. RR. Co. has been organized, with the following Directors: J. O. Weatherbee, S. B. Pearman and S. B. Hickley, Jr., of Boston; S. B. Hickley, Newton; W. M. Bacon, Winthrop, and Thomas Martin, Chelsea, Mass. The company proposes to build eight miles of line in Revere, Winthrop and East Boston.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

	1898.	1897.	Inc. or Dec.
Oct. 31. Chicago, Indianapolis & Louisville.			
1 month.....	Gross \$307,542	\$325,108	D. \$17,566
1 ".....	Net 106,971	120,368	D. 13,397
4 months.....	Gross 1,253,941	1,247,050	D. 6,891
4 ".....	Net 436,743	417,036	I. 19,707
Flint & Pere Marquette.			
1 month.....	Gross \$289,924	\$264,605	I. \$25,319
1 ".....	Net 87,496	86,151	I. 1,345
10 months.....	Gross 2,506,510	2,285,553	I. 220,957
10 ".....	Net 644,502	600,683	I. 43,819

	1898.	1897.	Inc. or Dec.
Oct. 31. Illinois Central.			
1 month.....	Gross \$2,466,737	\$2,439,390	I. \$27,347
1 ".....	Net 770,418	875,344	D. 104,926
4 months.....	Gross 9,275,421	8,945,348	I. 330,073
4 ".....	Net 2,637,797	2,604,963	I. 32,834
Kansas City, Fort Scott & Memphis.			
1 month.....	Gross \$432,889	\$477,016	D. \$44,127
1 ".....	Net 144,143	164,046	D. 19,903
4 months.....	Gross 1,587,297	1,752,364	D. 165,067
4 ".....	Net 514,613	582,624	D. 68,011

	1898.	1897.	Inc. or Dec.
Nov. 30. Great Northern System.			
1 month.....	Gross \$2,636,341	\$2,342,438	I. \$293,903
5 months.....	Gross 12,253,955	11,106,907	I. 1,147,048
New York Central & Hudson River.			
1 month.....	Gross \$4,148,197	\$3,925,076	I. \$223,121
St. Louis Southwestern.			
1 month.....	Gross \$629,456	\$559,331	I. \$70,125
1 ".....	Net 250,000	203,521	I. 46,479
5 months.....	Gross 2,586,513	2,369,970	I. 216,543
5 ".....	Net 741,000	664,521	I. 76,479
Texas & Pacific.			
1 month.....	Gross \$934,911	\$967,776	D. \$32,865
11 months.....	Gross 7,028,257	6,654,815	I. 373,442

ATCHISON, TOPEKA & SANTA FE.—At the annual meeting in Topeka, Kan., Dec. 8, the stockholders, in addition to ratifying the purchase of the San Francisco & San Joaquin Valley, decided to approve of the purchases and leases of the various roads called for in the notice of the meeting. (Oct. 28, p. 787.) The purchase of the San Francisco & San Joaquin Valley stock has been completed by a payment of \$2,300,000 to the Union Trust Co. for the 23,000 shares placed in trust to that company. There is an additional 1,398 shares of stock outstanding, much of which has been already bought at par. The A., T. & S. F. has authorized the Trust Company to buy all of these shares offered at par. (Dec. 9, p. 887.)

BALTIMORE & OHIO SOUTHWESTERN.—According to report, negotiations have been completed with Speyer Bros. of New York in conjunction with the associated reorganization managers of the Baltimore & Ohio in New York City for adjusting the affairs of the B. & O. S. W. It will be necessary to raise nearly \$10,000,000 of new capital, of which \$5,500,000 will be required for improvements and the rest for equipment notes and reorganization expenses. Kuhn, Loeb & Co., of New York, are associated with Speyer Bros. (Dec. 9, p. 887.)

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—Judge Taft, in the United States Circuit Court at Cincinnati, O., Dec. 7, decided that the \$200,000 net earnings to be distributed on Jan. 1 next should be used first to pay the Kentucky and Tennessee creditors in full. The Kentucky claims aggregate \$33,432, and the Tennessee claims, \$11,131. The remaining earnings are to be distributed to the other creditors on a 25 per cent. basis.

Samuel Spencer, President, and Francis Lynde Stetson, General Counsel of the Southern Ry., are seeking to obtain an extension of the lease of the Cincinnati Southern to the C., N. O. & T. P., which will expire in about seven years. The Southern Ry., jointly with the Cincinnati, Hamilton & Dayton, in 1895 secured a controlling interest in the capital stock of the C., N. O. & T. P., which leases the Cincinnati Southern from the city of Cincinnati. The leasing company went into the hands of a receiver March 19, 1893.

COLUMBUS, HOCKING VALLEY & TOLEDO.—According to report, the reorganization plan will be issued before the end of the year. It is understood that it contemplates a general 4½ per cent. mortgage, with a large proportion of junior bonds converted into preferred stock. (Sept. 9, p. 655.)

DETROIT & LIMA NORTHERN.—The Reorganization Committee, of which John E. Borne, New York, is President, announces that upward of three-fourths of the bonds have been deposited, and that the time for deposits was to be limited to Dec. 15, after which date no bonds would be accepted except upon payment of a penalty of 1 per cent. (Dec. 2, p. 870.)

ILLINOIS CENTRAL.—It is announced through H. G. Burt, President of the Union Pacific, that the I. C. has signed a contract for the use of the U. P. bridge into Omaha, Neb., and for the occupancy of the new U. P. station now building at Tenth and Marcy streets. This agreement is to provide for the Fort Dodge & Omaha extension of the I. C., now building.

INDIANA & LAKE MICHIGAN.—Wm. Knappes of Indianapolis, Special Master in Chancery, sold this property at foreclosure sale Dec. 8, at South Bend, Ind., to ex-Governor Bulkley of Connecticut, and Maurice L. Scudder of New York, representing the bondholders, for the upset price of \$100,000. The sale was made on petition of the Central Trust Co., New York. (Nov. 25, p. 854.)

LARAMIE, NORTH PARK & PACIFIC.—This property was recently sold at delinquent tax sale for \$390.32. It extends from Laramie, Wyo., to Soda Lake, 13.36 miles, and was formerly part of the Union Pacific system. It went into the hands of the receivers with the parent company Oct. 13, 1893, and operation was suspended in April, 1897, and the rails removed, leaving only the ties. (April 9, 1897; p. 268.)

LITTLE ROCK & MEMPHIS.—Judge John A. Williams, in the United States Circuit Court at Little Rock, Ark., has approved the sale of this property at public auction to the bondholders' committee on Oct. 25. The balance of the purchase price, \$300,000, is to be paid Dec. 19. The L. R. & M. is to be connected with the Choctaw, Oklahoma & Gulf at Little Rock, and to form a part of that system. (Oct. 28, p. 788.)

LITTLE ROCK, HOT SPRINGS & TEXAS.—Judge John A. Williams, in the United States Circuit Court, at Little Rock, Ark., Dec. 5, refused to affirm a private sale of this road made to a syndicate headed by Col. S. W. Fordyce, late President of the St. Louis Southwestern, and ordered the Master to advertise a public sale of the property for Jan. 5 at the upset price of \$50,000, of which \$10,000 is to be in cash and the balance paid in six months. The receiver is authorized to use an amount not to exceed \$3,000 of the purchase price to close up

all right of way negotiations along the line. (July 29, p. 556.)

MISSOURI PACIFIC.—This company has paid off a loan of about \$1,300,000 to Russell Sage, thus cancelling its entire floating indebtedness. In 1895 the company authorized an issue of \$3,256,000 collateral trust gold notes, which were accepted for their advances by all the floating debt holders except Mr. Sage, who preferred to hold Iron Mountain 5 per cent. bonds as security. The collateral trust bonds were sold, according to report, at 97½, and the proceeds used to pay the loan.

NEW YORK, NEW HAVEN & HARTFORD.—The company has sold \$1,300,000 of its \$3,161,400 treasury stock, received in exchange for New England stock. This sale was to retire \$1,000,000 New York, Providence & Boston first mortgage 7's, and \$1,300,000 New Haven & Northampton 7's, maturing Jan. 1 next, and \$200,000 Hoosatic rolling stock certificates, maturing July 1 next.

NORTHERN ALABAMA.—This company has executed a supplemental mortgage under which \$400,000 of the \$1,700,000 outstanding bonds in 1896 are made prior lien bonds. The new bonds have been sold and the proceeds used to pay the floating debt.

OHIO SOUTHERN.—The Circuit Court has confirmed the foreclosure sale made Oct. 15 to the first mortgage bondholders, and has declared against the appeal of the Central Trust Company to place the car trust bonds ahead of the mortgage. (Dec. 8, p. 870.)

OREGON RAILROAD & NAVIGATION.—Messrs. Kuhn, Loeb & Co., New York, give notice that their offer to convert 6 per cent. first mortgage bonds of the old company into new 4 per cent. consolidated mortgage bonds will cease Dec. 31. (Nov. 18, p. 840.)

SEABOARD AIR LINE.—Col. John A. Tompkins of Baltimore, and Hamilton S. Corwin of New York, expert accountants, were appointed on Dec. 7 by the special committee of stockholders and Directors, of which Decourcy W. Thom is chairman, to examine into the condition of the Seaboard & Roanoke on one of the charges of Thos. Ryan, New York. (Dec. 9, p. 887.)

SOUTHERN.—Forty-nine Georgia Pacific equipment mortgage bonds of July 17, 1889, have been drawn for the sinking fund for payment with the coupons due Feb. 1, after which date interest will cease.

STATE LINE & SULLIVAN.—At the meeting of the stockholders on Dec. 8 it was voted to refund the gold bonds maturing Jan. 1 next into new \$300,000 bonds at 4½ per cent., to mature in 30 years. (Oct. 28, p. 788.)

STUTTART & ARKANSAS RIVER.—Judge John A. Williams, in the United States Circuit Court, Dec. 6, issued an order postponing the sale from Dec. 8 until Jan. 20. The sale was ordered Aug. 2. The line runs from Stuttgart to Gillett, 41 miles, and has been in the hands of a receiver since Aug. 20, 1895. (June 17, p. 446.)

TERRE HAUTE & LOGANSPOUT.—T. V. Malott, Indianapolis, Ind., the old receiver, has issued a circular announcing that the new company has acquired control of the property, to be operated hereafter by Mr. Malott as trustee for the owner, and that all balances of the old company will be settled by him. The road was sold at foreclosure Nov. 18 to J. T. Brooks for the Pennsylvania Co. (Dec. 9, p. 887.)

Wm. P. Fishback, Master in Chancery, on Dec. 5 reported that the purchase price of \$1,060,000 had been paid and the road and property delivered, and asked the approval of the sale and transfer, which was granted.

WILMINGTON & NORTHERN.—A committee comprising W. W. Kurtz and Charles S. Whelen of Philadelphia, and Samuel Bancroft, Jr., of Wilmington, Del., has been formed to protect the minority stockholders, and calls for deposits of the stock. A majority of the stock was bought recently by the Philadelphia & Reading. (Oct. 28, p. 788.)

The road will pass into the hands of the P. & R. on Jan. 1.

WISCONSIN CENTRAL.—Judge Jenkins, in the United States Circuit Court at Milwaukee, Wis., Dec. 10 signed an order authorizing the committee representing the first mortgage bondholders to come into the foreclosure action instituted by John A. Stewart, trustee, to determine the standing of the securities they represent. (Dec. 2, p. 870.)

Electric Railroad News.

ALLENTOWN, PA.—At a meeting of the Allentown & Kutztown Traction Co., held in Allentown Dec. 2, Geo. Misch and Geo. Misch, Jr., of Philadelphia, retired as Directors. The new officers are: President, H. J. Schmick of Hamburg; Secretary, G. H. Gerber of Pottsville; Treasurer, C. A. Dorney, Allentown; Directors, H. J. Schmick, G. H. Gerber, C. A. Dorney, Howard E. Ahrens, Reading; Asa R. Beers, Mauch Chunk; W. D. Mohn, Mohnsville.

BALTIMORE, MD.—A resolution has been introduced into the City Council directing the City Solicitor to investigate the charter of the Edmondson Avenue, Catonsville & Ellicott City Ry., which forms the Catonsville branch of the Baltimore Consolidated RR., to ascertain if the charter should be forfeited. Wm. A. House, Vice President and General Manager of the B. C., informs us that a communication has been received from the City Solicitor advising against any attempt to take such action in the matter, as in the interim the road had been put in operation.

The Baltimore City Passenger Ry. was reported sold Dec. 8, for \$12,600,000 to the Baltimore & Northern Electric Ry. Co. The price paid was \$90 per share, the par value of which is \$25. The purchasing syndicate is Alexander Brown & Sons. The Baltimore City Passenger Ry. Co. is capitalized at \$3,500,000, and its mortgage indebtedness amounts to \$2,000,000. For several years it has been paying 10 per cent. dividends on its stock.

CHATTANOOGA, TENN.—The Chattanooga Electric Ry. has filed a consolidated mortgage with the Maryland Trust Co. of Baltimore as trustee, for

\$625,000 of 5 per cent. bonds. President Warner of the company says: "This new mortgage takes the place of the \$625,000 old bonds now existing, the object being to reduce the interest from 6 to 5 per cent. We have made arrangements with the bondholders to refund the old bonds into the new consolidated loan covering the entire property."

BROOKLYN, N. Y.—The quarterly earnings of the Nassau Electric RR. Co., ending Sept. 30, are reported as follows:

	1898.	1897.	Inc.
Gross earnings.....	\$685,253	\$633,041	\$52,212
Net earnings.....	294,006	290,823	3,183

CHICAGO, ILL.—Elijah B. Sherman, appointed by the United States Circuit Court for the Northern District of Illinois as Special Master for the sale of the Metropolitan West Side Ry., gives notice that he will sell at auction that road on Jan. 4, 1899. All property will be offered for sale in one parcel. No bid will be accepted for the property for less than \$6,000,000, all bids to be accompanied by a certified check of \$50,000 upon any national bank or trust company in the city of Chicago or the city of New York.

The Northwestern Elevated RR. has perfected its loan of \$4,400,000 which it has been negotiating for some time. It is reported the loan was made through J. I. Blair & Co. of New York. As soon as the money is available work on the road will be pushed rapidly to completion.

GREEN BAY, WIS.—Chas. H. Holmes, former President of the Fox River Electric Ry., and holder of about \$12,000 of the capital stock and interest coupons of the company, has brought suit against Mitchell Joannes of Green Bay and Thomas Spence of Milwaukee, as Receivers of the company, and the Farmers' Loan & Trust Co. of New York as trustee of mortgage. Mr. Holmes alleges that \$117,000 par value bonds of the company were illegally issued, and charges that the receivers have illegally carried on the receivership, looking toward a reorganization instead of winding up the company's affairs. The receivers were appointed in January, 1898.

LANCASTER, PA.—The Pennsylvania Traction Co., which has been in the hands of a receiver since November, 1896, is to be reorganized, and a committee has been appointed with that object in view. The committee consists of W. B. Given, at present Receiver; Samuel R. Shipley, President of the Provident Loan & Trust Co. of Philadelphia; J. W. Bousman, President of the Farmers' National Bank, Lancaster, and John D. Skiles, President of the Fulton National Bank, Lancaster. The foreclosure sale will take place about Jan. 1. The new company is to be known as the Conestoga Traction Co. The P. T. Co. controls and operates nine street railroad companies, comprising 50 miles of electric road. The receiver's report for last year shows an increase of receipts of \$15,005 over the previous year. (April 15, p. 286.)

LAWRENCE, MASS.—The Lowell, Lawrence & Haverhill St. RR. Co. has filed a petition to the Legislature for an amendment to its charter relative to its capital stock. The present stock of the company is \$1,900,000, of which \$1,500,000 is already issued. G. H. Campbell is President. (April 22, p. 302.)

MINNEAPOLIS, MINN.—The Twin City Rapid Transit Co. has called for redemption 30 Minneapolis St. RR. bonds of 1880. They will be redeemed at 105 and accrued interest by the Farmers' Loan & Trust Co., New York. The interest ceases May 1, 1899.

MYERSVILLE, MD.—At a meeting of the Catoclin & Myersville Electric Ry. Co., held Dec. 3, the following Directors were elected: Cyrus F. Flook, D. C. Winebrener, Geo. W. Smith, Joseph W. Gaver, Wm. M. Bittle, John C. Leatherman, Geo. D. Gaver, Chas. Johnson and John T. Hildebrand. The company recently completed 5½ miles of road to Middletown, where it connects with the Frederick & Middletown Ry. The stockholders of the two roads are practically the same. (Oct. 21, p. 769.)

NEW ORLEANS, LA.—A committee of the Reorganization Committee of the New Orleans Traction Co., consisting of R. M. Wamsley, Chairman, of the Louisiana National Bank, New Orleans; E. W. Clark, Jr., of E. W. Clark & Co., bankers, Philadelphia, Pa., and John C. Russell of Louisville, Ky., with A. H. Ford, New Orleans, La., as Secretary, has been organized to effect a reorganization of the company and its constituent companies. Copies of the plan of reorganization can be obtained of any of the committee, or of the depositories. Holders of the Crescent City RR. stock and consolidated 5s, New Orleans City & Lake RR. and New Orleans Traction stock and collateral trust notes, are notified to deposit their holdings with the Continental Trust Co. of New York, the Fidelity Trust & Safety Vault Trust Co., Louisville, Ky., or the United States Trust & Savings Bank, New Orleans. Holders of said stock failing to deposit it on or before Jan. 10, 1899, forfeit their right to participate in the plan. The New Orleans Traction Co. was formed in 1893 for the purpose of controlling street railroad properties in New Orleans. It owns a controlling interest in the Crescent City RR. Co. and the New Orleans City & Lake RR. Co. The following are the changes proposed:

C. C. RR. Co. 5 per cent. bonds to be exchanged dollar for dollar for new N. O. C. & L. RR. Co. general mortgage 4½ per cent. gold bonds—4 per cent. for five years, 5 per cent. thereafter.

N. O. T. Co. 6 per cent. collateral trust notes to receive 100 per cent. in new N. O. C. & L. preferred stock and 50 per cent. in new N. O. C. & L. common stock.

N. O. C. & L. RR. common stock not held by the Traction Company (minority stock) to receive 110 per cent. in new N. O. C. & L. preferred stock, and 25 per cent. in new N. O. C. & L. RR. common stock.

C. C. RR. stock not held by the Traction Company (minority stock) to receive 100 per cent. in new N. O. C. & L. RR. common stock.

Raise \$300,000 by the assessment of N. O. T. Co. stocks, giving new N. O. C. & L. preferred stock at par for the assessment as follows:

1.—N. O. T. Co. preferred stock: To pay \$6 per share, and to receive \$6 in new N. O. C. & L. preferred stock and \$100 in new N. O. C. & L. common stock; or to pay no assessment and receive \$50 in new N. O. C. & L. common stock.

11.—N. O. T. Co. common stock: To pay \$3 per share and to receive \$3 in new N. O. C. & L. preferred stock, and \$22.50 in new N. O. C. & L. common stock; or to pay no assessment and to receive \$10 in new N. O. C. & L. common stock. (Oct. 7, p. 734.)

An ordinance has been introduced in the City

Council directing the City Attorney, in the name of the city, against the Algiers, Goulsboro & Gretna RR. Co., for alleged failure or refusal to fulfill certain obligations as to maintenance of tracks, etc. The ordinance calls for the forfeiture of the company's franchise. The A. & G. RR. operates 3.7 miles of horse railroad in New Orleans. A. M. Haliday is President and Superintendent.

PHILADELPHIA, PA.—The Fairmount Park Transportation Co., which operates 10 miles of electric railroad in Philadelphia, has asked permission to issue bonds to the amount of \$150,000 as a mortgage on the franchises of the company. A first mortgage of \$500,000 5 per cent. gold bonds was issued Sept. 1, 1897. The authorized capital stock of the company is \$200,000, of which \$770,000 has been issued.

ROCKFORD, ILL.—The Rockford Ry., Light & Power Co., formerly the Rockford City Ry., has been granted permission to increase its capital stock from \$250,000 to \$350,000.

ST. CLAIR, MICH.—Jas. G. Tucker of Mount Clemens, Mich., Receiver for the Detroit & River St. Clair Ry., on Dec. 3 made a report to Judge Vance in the United States Circuit Court at Port Huron, Mich., in which he stated that receiver's certificates to the face value of \$71,849 had been issued of the total authorized issue of \$75,000. The court authorized a further issue of \$35,000 to take care of outstanding liabilities and to meet current expenses. The debit account of the Receiver shows a total of \$80,921, including \$18,229 obtained on loans. The credits are as follows: Paid on labor and payrolls, \$24,277; equipment, \$51,962; Baldwin motor, \$4,000; personal expenses, \$682. The issue of certificates was authorized last year to complete the road from Clearfield, Mich., about 18 miles to Algonac. (Dec. 3, 1897; p. 860.)

WILMINGTON, DEL.—The Wilmington & Elsmere Electric Ry., which was recently sold to the Wilmington & Brandywine Springs Ry., was on Dec. 9 delivered to its new owners, and a new organization was perfected by electing the following officers: President, R. W. Crooks, Brandywine Springs; Secretary and Treasurer, Dr. L. H. Ball, Faulkland. The Directors are Mr. Crooks, Dr. Ball, F. L. Barry and John Dobson, Philadelphia, and Wm. S. Hilles of Wilmington. (June 17, p. 445; Oct. 28, p. 787.)

WORCESTER, MASS.—The Board of Railroad Commissioners on Dec. 5 gave a hearing on the petition of the Worcester & Marlboro St. RR. for permission to increase its present capital stock of \$200,000 by \$45,000, for the purpose of floating its funded indebtedness. The company has now \$200,000 first mortgage 5 per cent. 20-year gold coupon bonds, authorized and issued, bonds being dated Oct. 18, 1897.

WYANDOTTE, MICH.—The Wyandotte & Detroit River Ry. has been sold to J. C. Hutchins, Vice-President and Treasurer of the Detroit Citizens' Ry. Co., and to A. B. du Pont. It is reported that the W. & D. R. R. is to be operated as a part of the Detroit Citizens' Ry.

TRAFFIC.

Traffic Notes.

Shipments of pig iron from Birmingham, Ala., for export are now averaging 1,000 tons a day.

Oranges are now being shipped eastward from Southern California at the rate of 50 cars a day.

It appears from a later dispatch that the very low rate lately made for the transportation of New York soldiers coming home from Manila was from Ogden to New York, instead of from San Francisco. The rate is now given as \$9.60 per capita, and the road that made it was the Burlington. The distance from Ogden to New York is about 2,700 miles, making the rate per passenger per mile 3.55 mills.

The Fruit and Produce Trade Association of New York has sent a sharp letter to all the railroads urging reform in the matter of properly filling out freight bills presented for collection. Notice is given that all such bills will be expected to give the name of the shipper, original point of shipment, marks, articles, rate of freight and total amount of charges. Without proper bills the commission merchants are unable to give proper vouchers for charges made against the consignor. The members of the trade further give notice that they will request all shippers to furnish the needed details to agents.

The Executive Committee of the Southwestern (freight) Bureau has met and considered the question of reorganizing the Association, but has postponed action until Jan. 16. The Committee approved of what the Chairman had done in complaining to the Interstate Commerce Commission of the Baltimore & Ohio for violation of law. It is said that the Missouri Pacific, which withdrew from the Association because of the action taken against the Baltimore & Ohio, has rejoined the Association, on the understanding that nothing of the kind shall be done again.

Chicago Traffic Matters.

Chicago, Dec. 14, 1898.

The western roads are preparing to enforce their 1899 pass agreement in a stricter way than they have ever done before.

There is good ground for the assertion that the Chicago Great Western will soon cancel the obnoxious special tariffs which caused the Santa Fe and the Rock Island companies to declare their intention of severing all relations with the Stickney line. Other roads were getting ready to cut off the Great Western, and it is this fear of a general severance of traffic arrangements that prompts the Great Western's change of heart.

While rate meetings are being held here daily by representatives of both eastern and western lines, the prospect for anything like a permanent stiffening of tariffs is still remote. Provisions and grain are going eastward at any figure the railroads can get out of the shippers. A ten cent contract on either commodity is no sensation these days. Two-thirds of this traffic is going at this figure.

Notwithstanding the many agreements and settlements that have been made—on paper—between the American lines and the Canadian Pacific, the latter continues to do about as it pleases when there is a dollar in sight. Its Soo line has reduced rates—both passenger and freight—in a half dozen different ways during the last week, and the best thing the American roads can get out of it is a conference.